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ABSTRACT

Designed to be used in conjunction with a school district's educational goals and focusing on what is to be learned rather than the methodology to be used, the program and course goals presented here are intended as guidelines for planning and evaluating elementary and secondary school curricula in computer education. Of four possible levels of goals, only program (general outcomes) and course (specific outcomes) goals are included, leaving the use of behavioral and/or planning objectives optional at the classroom teacher level. Two taxonomies are provided: the first describes the three types of goals in this collection--knowledge (information), process (skills and abilities), and values (attitudes and opinions); the second classifies a specific subject (computer education) into components (e.g., computer systems, hardware, software, applications). Program goals are listed for both career and computer education, and course goals are given for values and computer education, processes of inquiry and problem-solving, basic education and computer education, computer systems, calculators, computer hardware, computer software, computer applications, computer uses in business and industry, history of computer development, computer science, and computer education and careers. A concept list, an index to computer-related issues, and a subject index are attached. (MER)

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COURSE GOALS IN COMPUTER EDUCATION, K-12

Produced by the Tri-County Goal Development Project

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INTRODUCTION

This book contains goals for use in planning and evaluating elementary and secondary school curricula in computer education. Computer education includes such topics as computer literacy, computer science, computers and society, data processing, and computer programming.

It is the purpose of this volume to help decide what should be learned, not how. By focusing attention exclusively on what should be learned, questions of instructional program and methodology can remain open. The more clearly teachers understand what learning they are trying to help students acquire, the more clearly they can perceive instructional program and methods requirements.

Why goals at all?

Goals are statements that make clear what learnings students may acquire as a result of their education. This volume and others in the Tri-County collection include goal statements that teachers and curriculum personnel can use when considering options and making decisions about outcomes to which they will be committed.

What kind of goals are in this collection?

Levels. Figure 1 illustrates four possible levels of goals. Two of these are included in this collection. Program goals describe general outcomes; course goals describe more specific outcomes. These goals are suited to different types of planning. Program goals serve as guides to planning and organizing programs at district and subdistrict levels. Course goals serve as guides to planning courses in schools and departments.

At the system level, the board of education is responsible for approving statements enunciating the district's educational goals. Such district goals will guide selection from and adoption of the program and course goals provided here.

It is important to understand that course goals require further elaboration (into instructional goals) before they are specific enough to serve as the heading of a daily lesson plan. Course goals are specific enough to leave no doubt about what the major outcomes of a course are to be, but not so detailed as to spell out precise outcomes of instruction from day to day.

Examples of behavioral and performance objectives are also given in Figure 1 to show how they differ from program and course goals. While program and course goals represent clearly stated learning outcomes, the "behavioral objective" adds performance specifications for demonstrating learning, and the "performance objective" adds proficiency level specifications.

With goal-based systems of planning and evaluation, behavioral and/or performance objectives may or may not be used. Other forms of measurement specifications may be preferred.

Types.

Basically, three types of goals are in the collection: knowledge (information); process (skills and abilities); and values (attitudes and opinions). Classification systems (taxonomies) are provided that describe these different kinds of goals. The distinctions among the taxonomies of knowledge, process, and values (found on the yellow pages) and the subject matter taxonomy (pink pages) need explanation. The subject matter taxonomy classifies a specific subject (computer education) into components (computer systems, hardware, software, applications, etc.). Goals are placed under headings and subheadings familiar to teachers, to help them locate the goals they are looking for. The subject matter taxonomy, therefore, organizes the collection to facilitate review of a wide range of possible learning outcomes and their retrieval for planning purposes.

Figure 1

PLANNING	System Goal:	Students will know and be able to apply computers in a fashion appropriate to their present and future personal, career, or educational needs.	
	Program Goal:	The student knows principles, procedures, and limitations of computer systems and can use computers as a tool for inquiry, problem-solving, and recreation.	To be found in the course goal collections
	Course Goal:	The student knows the difference between system commands and program language statements.	
	Instructional Goal:	The student knows that LIST, RUN, SAVE, and DELETE are system commands in the BASIC language.	
MEASUREMENT	Behavioral Objective:	Given the list of words LIST, RUN, SAVE, DELETE, GOTO, END, READ, and REM mixed together, the student will identify the first four as system commands in the BASIC language.	Not integral part of Tri-County Project System of Goal-Based Planning
	Performance Objective:	Given the list of words LIST, RUN, SAVE, DELETE, GOTO, END, READ, and REM mixed together, the student will identify the first four as system commands with 100% accuracy.	

Note: At the classroom teacher level, course goals must undergo a final translation into instructional goals and learning experiences. The Goal Development Project has chosen not to extend into this level of planning detail.

The taxonomies of knowledge, processes and values (yellow pages) are generic classification systems, and serve a different set of purposes from the subject matter taxonomies. They represent kinds of things which are to be taught and learned within and across subject fields. Goals in all collections are coded to their respective K, P, or V categories. Thus, whether a set of selected goals is from one subject field or several, the set may be examined to see whether it makes up a balanced or desirable representation of kinds of things students might know, be able to do or value as a result of the course or program for which the goals were selected.

Like the other codes used with course goals (see pp.xii - xvi of this Introduction), the K, P, and V categories can also be used for computer retrieval of goals. One can, for instance, request and receive a printout of all computer education goals coded K2 (Conventions: Symbols, Rules, Standardized Processes, Definitions) and H (Higher level).*

The knowledge classifications (see "Knowledge Categories" in the yellow pages) are an eclectic system based partly on Bloom's knowledge categories and partly on an examination of the nature of some 30,000 learning outcome statements written for the 12 currently published course goal volumes.

The process classifications are intended to represent conventional (standardized) processes of acquiring, validating, organizing and interpreting information, and of using that information to make decisions, to produce new knowledge and to communicate. This classification system seemed more appropriate to describe school process learning than the mental process categories of Bloom's system.

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* Computerization of this collection is being undertaken. (Address inquiries to Director of Measurement & Assessment, Multnomah County Educational Service District, 220 S.E. 102 Avenue, Portland, OR 97216). Computerized goal retrieval service of the type described should be available about July 1, 1979.

The values taxonomy was developed after examining several hundred "value words" assigned to goals by teachers who had been instructed to identify values associated with knowledge and process goals. The values taxonomy resulting from this analysis provides a useful tool for considering different kinds of values that might be desirable outcomes of educational experiences.

Value goals are included in the section on "Values and computer education." While not an exhaustive treatment of this relationship, the section does contain: (a) knowledge and process goals which connect Computer Education with the clarification and expression of personal and societal values, (pp.1-9); and (b) goals which begin with the words "The student values," representing potential value choices to which Computer Education curricula and instruction might contribute (pp.10-15). Neither the value goals nor the taxonomy of values are meant to be closed or final. Suggestions for their improvement will be welcomed, as will suggestions for improvement of any part of this collection.

Instructional planning and evaluation for value goals differ in important ways from planning and evaluation for knowledge and process goals. Experience and studies suggest, for example, that values arise and are formed in the process of learning and teaching--the classroom environment--and not necessarily from the direct teaching of values. To help students acquire particular values, the educator relies on teaching knowledge and skills that have a logical bearing upon these values, and on positive examples and reinforcements supplied by the learning situation itself. (Values communicated by classroom organization, school routines, teacher behaviors, etc. can be utterly inconsistent with stated value goals, unless examined and restructured with these value goals in mind.) Where the teacher is concerned with the teaching of value clarification and formation processes, s/he teaches the nature and application of such conventional skills as verifying information, relating information to criteria, and other methods of clarifying personal and social values.

There are many reasons for this attempt to deal seriously with the values dimension of Computer Education as a legitimate arena for values education. It is becoming clear that concern for knowledge and process without relating such learning to personal and social problems and issues (and the often conflicting values that produce them) fails to provide the learner with a psychological basis for internalizing, evaluating and putting to appropriate use the information and skills acquired. At this point in history, national and international events are revealing the serious implications of having knowledgeable and able people in sensitive and creative positions of public or private trust who lack perspective, a sense of ethics, and personal integrity and responsibility. Computer Education's body of knowledge and techniques heavily affects all contemporary social processes. Applications of computer-related procedures and models are bases for decision-making of every sort, at every level of every institution; computer-related studies are shaping understandings, skills and attitudes of virtually everyone educated in a modern society.

If learning is to be effective, it must involve the student in highly personal, value-laden interactions with that which is to be learned. And if individuals and institutions are to use computer technology ethically and responsibly, resources must be provided to help teachers and students recognize and clarify value implications of what is learned with and about computers.

Where did the course goals come from?

The course goals are developed by outstanding teachers using available models and guides. Goals for this critique edition were drafted in the summer of 1978. The goal writers and specialists (see credits page) were supported by Tri-County and Oregon and Washington state curriculum and evaluation personnel and by selected university and public school consultants.

More than 55 local school districts in the Tri-County area of metropolitan Portland are active in the Project. This has been achieved with coordination through the Education Service Districts of the three counties. Representatives from Oregon school districts outside the metropolitan Portland area, from the states of Oregon and Washington, and from private school systems have also made valuable contributions.

Its broad base of participation strengthens the Project in a number of ways. First, it provides greater financial and personnel support than any single district could provide. Second, it makes available a large and representative pool of teacher talent to draw on for goal development committees. Third, it provides a widely representative testing ground for the theories and products of the Project.

How can the goals in this collection be used?

School systems may use the collection to clarify purposes of education for students, teachers, parents, and the community. This collection can be used as a basis for judging the comprehensiveness and adaptability of goals and objectives of textbooks with local courses of study. New learning possibilities can be formulated and discussed. Statements already produced or being considered as learning outcomes can be evaluated for conciseness, clarity, and accuracy. These kinds of studies, aimed at assuring agreement on goals and suggesting ways and means of attaining them, can be undertaken by individual teachers; or by groups of teachers and support personnel from all levels of a school system; or across grade levels, divisions, or secondary school departments.

The project provides an important resource for improving the quality and extent of participation of students, parents, teachers, school boards, and other citizens in deciding the mission of the schools.

Another use of the collection is to provide a basis for evaluation and accountability. This use requires development of procedures within a school system for making a commitment to learning outcomes at the program and course levels. The goals of this collection provide a wide range of clearly stated goals from which choices can be made. Once a commitment is made (a process that may involve boards of education, administrators, teachers, students, and citizens), the educational mission of the system and of each teacher can be known and can be communicated. Methods of instruction and evaluation best suited to the goals agreed on can then be planned. Under no circumstances, however, should goals stated for planning and communication be misused to limit the teacher's freedom to respond to spontaneous opportunities for learning, or be misapplied in the evaluation of teacher performance.

Another use of the collection is the rewriting or development of courses and curricula. The collection can serve planners as an "idea book," with the advantage that the ideas are expressed in forms directly usable as bases for course planning. Over the past few years, educators nation-wide have experienced the difficulty of trying to translate ideas and assumptions about what should be taught and learned into clear, well-defined statements of intended learning outcomes. By making learning options explicit and sharable, the collection can sharpen the focus of curricular planning.

One important example of curriculum development fostered by this collection is cross-disciplinary or inter-disciplinary planning. The goals, although printed in subject collections such as computer education, mathematics, language arts, science, social science, music, etc. may be related and grouped in and across subjects by any one or more of the goal codes: educational level, types of knowledge, processes and values, relation to subject area and career education program goals, and--in most collections--by related concept and value words (See p.xv of this Introduction).

In all the above activities, and in those we have not cited--or even thought of--districts are invited and encouraged to use the collection selectively and to add their own goals wherever this collection is insufficient to their needs. We hope that when they do add or modify they will let us know and thus help expand and improve the collection.

Is this the final version of the computer education goal collection?

No. The project is committed to a user-responsive system for continuous computer updating of goal collections with periodic major revisions of taxonomy, course and program goals as needed to improve a collection's validity, scope, or utility. In fact, the label "critique edition" is a request for complete examination and critical feedback by computer educators.

Groups of teachers, curriculum specialists, test developers and others using Tri-County collections are invited to submit to the Project editor new and revised goals, and suggestions for taxonomic changes or additions for computerized master versions of the collections. To date, Language Arts, Science, Social Science, Math and Art collections have undergone major revision, and are in print as Second Editions.*

Will help be available for evaluating student achievement of the goals in this collection?

Extensive work is under way in the States of Oregon and Washington to establish resources for goal-based evaluation. Through the Northwest Evaluation Association, test item banks are being developed that are referenced to the goals in the Tri-County collections. Each item is keyed to one or more of these goals and is field tested and assigned a difficulty level through Rasch item analysis and test scaling procedures. NWEA is now underwriting a variety of test development activities in reading, math, language arts and social studies. Work is soon to begin in science.*

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* Forms for submission of new and modified goals are available from Editor, Tri-County Goal Development Project, 220 S.E. 102nd Avenue, Portland, Oregon 97216 or P.O. Box 3107, Portland, Oregon 97208

Future directions.

The thirteen goal collections produced to date represent only a part of the goal-based planning, learning, and evaluation system toward which we are working. Students, teachers, department and building administrators, area, state, and national educators, and parents and citizens are all increasingly concerning themselves with defining outcomes of student learning. It has been pointed out that these goal collections give all of the above persons a resource to help define goals, and that the collections' comprehensiveness and organization increase the efficiency and effectiveness of a variety of goal selection processes.

What is needed yet and what we are now working toward include:

1. A system of multiple measurement items or at least models for each level of goal so that the person working toward a goal can select items which measure its attainment. (See preceding section on evaluation).
2. Transportable materials, models, and methods to help goal definers select, adapt from, and add to the existing collections in order to arrive at a clear, valid statement of their goals.
3. Transportable materials, models, and strategies to help goal definers use the goals in needs assessment, materials selection, curriculum planning and development, instruction, evaluation, and accountability.

A series of slide-tape presentations on use of the course goal collections in planning and evaluation has been produced by the curriculum component of the Tri-County Goal Development Project. These are not currently for sale, but may be available soon.

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* Address inquiries to Executive Secretary, Northwest Evaluation Association, P.O. Box 3107, Portland, Oregon 97208.

While we acknowledge the dangers (pointed out by Stake, Combs, and others) of oversimplification and overmechanization in goal-based planning, we believe those dangers can be avoided. Indeed, by presenting a wide range of potential learning outcomes, classified to provide a checklist of options of type of knowledge, process skills, and values, this volume should contribute significantly to the advancement of planning that is anything but simplistic and mechanized. The danger lies not in the statement of goals, but in the failure to find manageable instructional planning models that make it possible to pursue appropriate combinations of process, knowledge, and values goals in a planned learning experience. The old one-to-one relationship of an objective (goal) and a learning expierience fails to meet this prescription.

How to read and interpret the materials in this goal collection

Colored pages containing important references for the collection's users follow this introduction. Course goals are coded to the lists of computer education program goals (blue), career education program goals (green), and knowledge-process-value classifications (yellow). The subject matter taxonomy (pink) acts as the primary directory to course goals in these volumes.

The course goals themselves and their codes take up the bulk of the pages in this collection. Since our aim in these few pages is to learn how to read, interpret, and use these goals, let us look at and discuss a sample page from the computer education collection. Please refer to the following page, Figure 2.

Subject Matter Taxonomy Headings

The numbered headings and subheadings at the top of each page (7. Computer software, 7.2 Programming techniques, and 7.2.1 General programming information, in Figure 2) identify the major topic and sub-topics to which goals on the page are related. They can be read like points in an outline, or entries and subentries in an index. At the top of the left-hand column--where the texts of the

Figure 2

7. Computer software
7.2 Programming techniques
7.2.1 General programming information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.2.1.3 Problem refinement						
1. The student knows that a primitive is a basic step in solving a problem applicable to computer programming which can be expressed in one line of computer code.	I U H	K1 K2	4 7			(V) Problem solving
2. The student knows that a primitive cluster is a basic step, or group of steps, in solving a computer programming problem that can be expressed directly into computer code/ programming language.	I U H	K1 K2	4 7			
3. The student is able to refine a problem into a set of primitives or primitive clusters.	I U H	P43 P66	4 7			(V) Problem solving
4. The student is able to select a problem solving method which takes into account ease of data entry and user convenience.	U H	P63 P66	3 4 7			(V) Judgement
5. The student is able to use standard procedures to segment a complex problem into several smaller and more manageable problems.	I U H	P43 P63 P76	3 4 7			(V) Problem solving
6. The student is able to modify or select an algorithm to make efficient use of the computer that will execute the program (e.g., its speed, memory size, complexity).	U H	P35 P63 P67	3 7 8			(C) Efficiency
7. The student is able to refine an algorithm to make efficient use of the language in which the algorithm will be expressed.	U H	P35 P63 P67	3 7 8			

goals appear--is the most specific subheading to which the goals are assigned (in Figure 2, 7.2.1.3 Problem refinement). The goals under this subheading are numbered in sequence, so each goal is identified and retrieved by taxonomy and goal number.

The complete subject matter taxonomy is found in the pink pages which follow this introduction. It serves as a specific and detailed table of contents to goals in the collection. It also provides an overview of the scope and content of K-12 Computer Education, including important cross-disciplinary areas with which Computer Education intersects. As in most of the goal collections, the first three sections relate the subject field to values, to generalized processes of inquiry and problem-solving, and to basic education respectively, and the final section relates the subject field to career education.*

Level D/P/I/U/H (Developmental, Primary, Intermediate, Upper and Higher

This code provides an estimate of the grade level or levels at which the learning is appropriate. If the nature of the goal suggests continued learning over several levels, all levels involved are coded. These levels are approximate, for it is evident that the appropriate time for learning varies with the interests and abilities of students and the organization of the school. In addition, computer education in grades K-12 is so new and changing so rapidly that questions of sequence are unsettled.

The D code has recently been added to the Tri-County collection. It denotes goals which are developmental prerequisites to Primary-level knowledge and skills, or which could be attained by students operating at a pre-Primary level in the particular domain of knowledge or skill the goal addresses.

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* These sections contain many goals which are not specific to computer education, but rather describe learnings of generalized importance to which computer education may contribute. They are included for the convenience of interdisciplinary and/or elementary planners. Goals specific to Computer Education begin with section 4.

Knowledge, Process and Values Coding

Codes in column 3 refer to classifications found on the yellow pages of this column. These codes identify generic categories of knowledge, process (techniques, skills) and values that can be taught and learned.

Each goal that begins "The student knows" is coded to one or more of the categories K1 - K10. Some are also coded to categories of generalizations: G1 for those having the status of principle or law; G2 for simple generalizations. Goals coded G1 or G2 also have a K coding to indicate the generic type of knowledge that the generalization represents.

Each goal that begins with "The student is able" is coded to one or more of the categories P11 through P79 in the Taxonomy of Inquiry - Problem Solving Processes found in the yellow pages directly beneath Knowledge Categories.

Only goals in the "Potential Value Choices" section (1.2) are coded V in column 3. Goals in this section are Coded V1, V2, or V3 to correspond with the three major categories in the Taxonomy of Values in the yellow pages. For information on the coding of Knowledge and Process goals to value words, see the heading (C) Concept and (V) Value Words, below (p.xv).

Subject Area Program Goals

In this column we find the number of one or more of the Computer Education Program Goals found in the front on the blue pages. This type of goal was discussed earlier. Here it is enough to recall that program goals are more general than course goals and that a set of program goals should constitute a description of the major learning outcomes expected from a program. Each course goal is cross coded to the numbers of the program goal(s) to which it is most directly related.

Career Education Program Goals

In this column we find the code of one or more career education program goals found in the front on the green pages. Career education, as envisioned by the coders, concerns the total life of an individual, including life roles as a citizen, user of leisure, and family member as well as worker. Nearly every course goal bears at least an indirect relationship to career education viewed in that manner. Only those course goals, therefore, judged to have a direct relationship to a career education program goal have been coded to that program goal.

A direct relationship was interpreted to exist if a teacher could easily and naturally attach some career meaning to the instruction relating to that course goal and thus readily integrate the teaching of career education into the teaching of the subject. The restriction of the codings to direct relationships as just defined means that codings to career education program goals are relatively rare.

The career education code used with these goal collections makes them an operational resource for "integrating career education and the rest of the curricula." Naturally a great deal of work has to be done to refine and extend the applications which the present cross codings represent.

Other Related Content Taxonomy Headings

Where a goal deals with a subject that is also covered in another part of the collection, that other part will be indicated by its taxonomy number. Where a whole sub-section of goals relates to another whole sub-section, a (See also:---) appears directly under the heading.

(C) Concept / (V) Value Words

The final right-hand column is used to relate course goals to the particular values and organizing concepts which they may help to clarify or develop. The concept words (C) are taken from the list appearing in the Appendix (p. 169). The list was prepared after review of a wide range of curriculum materials for concepts to be represented. Each concept word also appears as an index entry, marked with an asterisk (*); all goals in the collection which are coded to it are entered beneath by page and goal number. Thus the index may be used to retrieve goals by concept, as well as by subject, for interdisciplinary and/or concept-based planning.

The value words (V) are taken from the Value Taxonomy discussed above.

It can be seen that in Figure 2 (p. that several goals contribute to the valuing of problem solving. The value of problem solving can be made immediate and real to students as they acquire and refine the knowledge and abilities described. To deal with a goal in ways that facilitate or clarify the valuing implied by the coding will, of course, require sensitivity, insight and ingenuity on the part of teachers.

The values list has evolved from efforts of the Project staff to classify values over a period of years.

Is this the final version of the program and course goals?

No. In the development of both the program and the course goals, an effort was made to make them comprehensive, realistic and applicable to today's schools. At the same time, the goals and taxonomy will be revised and improved as they are used and examined by teachers and curriculum personnel.

All readers and users of the collection are invited to contribute to its improvement by sending suggestions and criticisms to:

Linda B. Peters, Editor, Portland Public Schools, P. O. Box 3107, Portland,
Oregon 97208.

PROGRAM GOALS, COMPUTER EDUCATION

IR008935

PROGRAM GOALS

COMPUTER EDUCATION

1. The student knows events that have influenced or may influence computer development and use.

2. The student relates knowledge about computers to career goals and plans.

3. The student knows characteristics of computer-related hardware, software, and documentation, and principles underlying their design and use.

4. The student knows theoretical aspects of computer science appropriate to the student's level of computer use.

5. The student knows applications and uses of computers.

6. The student knows effects of computers on society.

7. The student knows principles, procedures and limitations of computer systems and can use computers as a tool for inquiry, problem-solving, and recreation.

8. The student values aesthetic components of computer science and computer applications.

9. The student is confident of the right to develop, hold, or express conventional or unusual ideas related to computers and computer applications.

10. The student is able to adapt concepts and processes of computer science to examine issues, to clarify personal values, to solve personal and social problems, and to satisfy personal curiosity.

11. The student knows and values ethical obligations and legal responsibilities related to computer use.

12. The student values knowledge and skills related to computing which enable individuals and groups to cope with the complexity of human society.

13. The student is able to make responsible decisions about computer uses that affect the student's economic, political, physical or social environment.

PROGRAM GOALS, CAREER EDUCATION

PROGRAM GOALS

CAREER EDUCATION

1. The student knows the personal and social functions and importance of work and therefore values and respects workers.

2. The student knows the relationship of the life role of worker to other life roles of citizen, user of leisure time, and family member.

3. The student knows the physical, psychological, and educational requirements of various careers.

4. In making career decisions, the student knows and is able to weigh the significant factors including his or her: (a) interests, (b) aptitudes, (c) abilities, and (d) the implications of the decision alternatives for his life roles as a citizen, user of leisure, and family member.

KNOWLEDGE, PROCESS AND VALUE CLASSIFICATIONS

-Knowledge Categories-

G1	Principles and Laws
G2	Simple Generalizations
K1	Conventions: Names and Nomenclature
K2	Conventions: Symbols, Rules, Standardized Processes, Definitions
K3	Properties, Parts, Characteristics, Features, Elements, Dimensions
K4	Trends and Sequences
K5	Similarities and Differences, Discriminations, Classifications
K6	Contexts, Locations, and Orientations
K7	Operations, Methods of Dealing with, Functions
K8	Cause and Effect Relationships (Costs and Benefits)
K9	Criteria or Standards
K10	Non Cause-Effect Relationships

-Inquiry-Problem Solving Processes-

P1 Input — Acquiring Information

- P11 Viewing
- P12 Hearing
- P13 Feeling (tactile)
- P14 Smelling
- P15 Tasting
- P16 Using sense extenders
- P17 Using internal sensors of emotion

P2 Input Verification — Insuring Validity and Adequacy

- P21 Evaluating authoritativeness of sources
- P22 Evaluating logical consistency and accuracy
- P23 Evaluating relevance to desired learning purposes
- P24 Evaluating adequacy for acting or deciding (comprehensiveness and depth)

P3 Preprocessing — Organizing Information

P31 Labeling, naming, numbering, coding
P32 Recording, listing
P33 Classifying, categorizing, grouping, selecting, according to criteria
P34 Ordering, sequencing
P35 Manipulating, arranging, transforming, computing
P36 Estimating
P37 Summarizing, abstracting

P4 Processing I — Interpreting Information (drawing meaning from data)

P41 Decoding verbal and non-verbal symbols (reading and literal translating)
P42 Inferring, interpolating, extrapolating
P43 Analyzing
P44 Associating, relating, equating
P45 Comparing, contrasting, discriminating
P46 Synthesizing
P47 Testing against standards or criteria
P48 Generalizing

P5 Processing II — Using Information to Produce New Information

P51 Theorizing, predicting
P52 Formulating hypotheses
P53 Testing hypotheses
P54 Revising hypotheses

P6 Output I — Acting on the Basis of Information

P61 Reacting
P62 Making decision
P63 Solving problems
P64 Restructuring values (adapting, modifying)
P65 Restructuring behavior (adapting, modifying)
P66 Encoding verbal and nonverbal symbols prior to communication
P67 Creating on the basis of knowledge and process

P7 Output II — Communicating Information

P71 Vocalizing (nonverbal)
P72 Gesturing, moving
P73 Touching
P74 Speaking
P75 Writing
P76 Using art media (painting, drawing, sculpting, constructing, etc.)
P77 Dramatizing
P78 Singing, playing instruments
P79 Dancing

Values Classifications

VI. Environment: Related Values

- VI.1 Qualities of environment
  - Complexity
  - Diversity (variety)
  - Order (regularity)
  - Unity
- VI.2 Coping with environment: activities
  - Exploring
  - Inquiring
  - Learning
  - Modifying
  - Adapting
  - Predicting
  - Planning
- VI.3 Coping with environment: modes
  - Fantasy
  - Logic
  - Research
  - Experimentation
  - Prayer
  - Mysticism
  - Invention
- VI.4 Using environmental resources
  - Knowledge of resources
  - Access to resources
  - Maintenance of resources

- Preservation of resources
- V1.5 Representing the environment
  - VI.5.1 Forms of representation
    - Images
    - Symbols
    - Models
  - VI.5.2 Qualities of objective representations
    - Clarity
    - Accuracy
    - Logical consistency
    - Relevance
    - Comprehensiveness
    - Predictive validity
    - Adequacy as basis for action or decision
  - VI.5.3 Qualities of artistic representations
    - Technique
    - Form, shape, structure
    - Harmony
    - Dissonance
    - Symmetry, balance
    - Rhythm, movement
    - Grace
    - Style
    - Eloquence
    - Integrity
    - Individuality
    - Beauty
- V2 Society and Culture: Related Values
  - V2.1 Social ideals
    - Justice

Democratic process
Rule of law
Equality
Freedom
Brotherhood
Social morality
Social responsibility
Peace
Productivity
Security
Unity of purpose
Pluralism
Stability
Progress
Honor
Literacy

V2.2 Social processes

Working
Communicating
Assembling
Participating
Sharing
Cooperating
Competing
Educating
Problem solving
Planning
Policy making

V2.3 Social rights

Freedom of speech

Freedom of assembly

Freedom of inquiry

Voting

Dissenting

Assenting

Privacy

Ownership of property

Equal protection under law

V2.4 Social institutions

Family

Schools

Government

Religious institutions

V2.5 Social regulators

Mores

Laws

Policies

Regulations (rules)

Ethics

V2.6 Cultural heritage (social conventions)

Language

Tools

Cultural arts

Cultural beliefs

Cultural knowledge

Cultural skills

V3 Personal Functioning: Related Values

V3.1 Qualities that contribute to personal effectiveness

- Curiosity
- Rationality
- Resourcefulness
- Perseverence
- Innovativeness
- Initiative
- Ingenuity
- Imaginativeness
- Creativity
- Commitment
- Adaptability - flexibility
- Judgment
- Health
- Insight
- Knowledgeability
- Responsibleness
- Efficiency
- Craftsmanship
- Self-discipline
- Openness
- Aesthetic responsiveness
- Intellect

V3.2 Qualities that enhance personal and social relationships

- Tolerance
- Appreciativeness
- Trust
- Thoughtfulness

Sensitivity

Respectfulness

Compassion

Love

Individuality

Humility

Dignity

Faithfulness

Empathy

Courage

Integrity

Humor

Morality

Cooperativeness

Social concern

Social sensitivity

Friendliness

Honest

V3.3 Conditions of self-esteem and self-actualization

Personal growth and development

Competence

Self-knowledge

Self-confidence

Self-respect

Self-reliance

Self-direction

Self-expression

Self-fulfillment

V3.4 Self-actualizing responses to environment

Curiosity

Concern

Respect for life

Wonder

Reverence

Awe

Satisfaction

Enjoyment

xxx

COMPUTER EDUCATION

TAXONOMY

COMPUTER EDUCATION TAXONOMY

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COURSE GOALS

COMPUTER EDUCATION

1. Values and computer education
1.1 Developing, clarifying and applying values

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
1.1.1 Interpreting personal values						
1. The student knows that one's system of values (preferences, tasts, standards, ideals, commitments, etc. that motivate choices and behavior) develops and changes as one grows, learns, and responds to new ideas and situations.	P I U H	G2 K3 K4 K8	9 10	4		
2. The student knows reasons for identifying and clarifying one's own values (e.g., to make more effective and rational choices; to resolve issues-involving conflicts between moral, ethical and/or aesthetic values; to increase self-awareness, self-direction and competence as one matures; to increase sensitivity to needs, rights and concerns of others).	P I U H	K6 K8	9 10	4		
3. The student knows ways experiences with computers (including concepts and processes of computer science) may help one to identify, clarify or restructure personal values (e.g., new information and skills refine and extend perceptions and interests; computer games, simulations and problem-solving models help one understand others' value positions, to identify one's own values and to resolve conflicts).	P I U H	K6 K7 K8	9 10	4		
4. The student is able to use appropriate computer-related devices (conversational programs, computer games, exercises, etc.) to aid in identifying or clarifying personal values.	P I U H	P63 P64	10			

COMPUTER EDUCATION

1. Values and computer education
1.1 Developing, clarifying and applying values

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
1.1.1 Interpreting personal values (cont.)						
5. The student is able to identify values underlying his or her attitudes toward, approaches to, or interactions with computers.	P I U H	P43 P44	9 10	4		
6. The student is able to recognize changes in attitudes, preferences, interests, etc. that occur as he or she acquires computer-related knowledge and skills.	P I U H	P43 P44	9 10 11 13	4		
7. The student is able to recognize personal value conflicts: situations in which one's differing values urge differing responses to an issue, opportunity or choice.	P I U H	P43 P44	10 11	4		
8. The student is able to compare or estimate relative intensities of values (e.g., rank, priortize).	I U H	P34	10	4		
9. The student is able to relate personal values to the physical and/or social-psychological needs they may serve or reflect.	I U H	P44	10	4		
10. The student is able to relate personal values to the situations giving rise to or supporting them (e.g., personal experiences; friends who share the values).	I U H	P44	9 10	2 4		

COMPUTER EDUCATION

1. Values and computer education
1.1 Developing, clarifying and applying values

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
1.1.1 Interpreting personal values (cont.)						
11. The student is able to distinquish between personal values which apply to specific situations (e.g., norms of a particular group) and broad value principles which can guide choices and judgments in many situations.	I U H	P45	9 10	2 4		
12. The student is able to use appropriate computer-related devices to analyze or resolve personal value conflicts.	P I U H	P43 P63 P64	9 10	4		

COMPUTER EDUCATION

1. Values and computer education
1.1 Developing clarifying and applying values

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
1.1.2 Analyzing issues						
1. The student knows requirements for informed, rational decisions/judgments about issues of personal and/or societal importance, including accurate, relevant, adequate information about the situation, the parties affected, their value positions, etc.	P I U H	K9	10	4		(C) Decision-making (V) Decision-making (V) Judgment (V) Accuracy (V) Relevance (V) Adequacy as basis for action or decision
2. The student is able to distinguish value statements (e.g., ratings, opinions, judgments) from descriptive or definitional statements.	P I U H	P45	10	4		(V) Discrimination (V) Judgment
3. The student is able to recognize computer-related issues over which people's values are in conflict.	P I U H	P43	10	4		(V) Social sensitivity (V) Social responsibility
4. The student knows steps in the analysis of a controversial issue by individuals or groups, including: (a) identify issue; (b) identify parties in conflict; (c) identify value positions of respective parties; (d) identify rationales, needs underlying value positions; (e) identify issues of fact and definition that require clarification.	P I U H	K2 K4	10 13	4		(V) Problem-solving (V) Decision making (V) Judgment (V) Social sensitivity (V) Social responsibility

COMPUTER EDUCATION

1. Values and computer education
1.1 Developing clarifying and applying values

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
1.1.2 Analyzing issues (cont.)						
5. The student is able to identify the central issue in a computer-related conflict or public controversy (e.g., the topic, question, legislative proposal, problem statement, etc. that is the focus of conflict).	P I U H	P63	10 13	4		
6. The student is able to identify the parties or groups or "interests" in conflict over a computer-related social (public) issue.	P I U H	P63	10 13	4		
7. The student is able to identify value positions taken by various parties (groups, institutions, or individuals) involved in a computer-related social issue.	P I U H	P63	10 13	4		
8. The student is able to identify key factual claims, logical propositions, and legal or ethical principles contained in the rationales supporting conflicting value positions on a computer-related social issue.	P I U H	P63	10 13	4		
9. The student is able to identify the needs underlying differing value positions on a computer-related social issue.	P I U H	P63	10 13	4		

COMPUTER EDUCATION

1. Values and computer education
1.1 Developing clarifying and applying values

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
1.1.2 Analyzing issues (cont.)						
10. The student is able to recognize aesthetic and/or communications problems clouding an issue or blocking effective dialogue by parties with conflicting value positions (e.g., discrepancies in their uses or interpretations of same terms, images or symbols; use by one group of terms or symbols whose meanings are obscure or threatening to adversaries).	P I U H	P63	10 13	4		
11. The student is able to identify symbols needing clarification or terms needing stipulation of definitions, for purposes of discussion or inquiry about a computer-related social issue.	P I U H	P63	10 13	4		
12: The student is able to use appropriate resources and procedures for clarifying meanings of key terms to be used in a following personal inquiry or group discussion about a computer-related social issue (e.g., personal inquiry: state and qualify intended uses of terms, citing examples, analogies, determining features of referents, etc. as needed to explicate meanings; group discussion: examine alternative referents, meanings, uses, and agree to use of terms as stipulated, qualified for purpose of discussion).	P I U H	P63 P66	10 13	4		

COMPUTER EDUCATION

1. Values and computer education
1.1 Developing clarifying and applying values

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
1.1.2 Analyzing issues (cont.)						
13. The student is able to adhere to clarified and stipulated uses of key terms in written or oral presentations of facts, opinions, propositions, etc. regarding a computer-related social issue.	P I U H	P63 P65 P66	10 13		3.1	
14. The student is able to identify discrepancies in the facts which conflicting parties consider (a) accurate or reliable and (b) relevant to the nature or resolution of the central issue.	P I U H	P45 P63	7 8 10	4		
15. The student is able to locate information needed to clarify or reconcile issues of fact which underlie or aggravate value conflicts over a central social issue (e.g., access data banks and search to assemble, interpret further data; verify sources).	P I U H	P63	10 13	4	2.1.2 8.10	
16. The student is able to weigh the merits of information supporting value positions, in terms of relevant criteria.	P I U H	P24 P63	10 13			
17. The student is able to identify or propose for group analysis alternative solutions to conflicts surrounding an identified social issue, based on adequate analysis of the respective value positions and needs of interested parties (e.g., suggest bargains, compromises).	P I U H	P63	10 13	4		

COMPUTER EDUCATION

1. Values and computer education
1.1 Developing clarifying and applying values

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
1.1.2 Analyzing issues (cont.)						
18. The student is able to use appropriate resources and procedures to analyze and test alternative solutions to conflicts surrounding a computer-related social issue (e.g., determine potential effects of each alternative, if implemented; weigh costs and benefits to interested parties; assess viability-workability of solutions proposed).	P I U H	P63 P64	10 13	4		
19. The student is able to suggest ways that a plan or proposal might be revised to more adequately meet the needs of parties involved in a value conflict over a computer-related social issue.	P I U H	P63 P64	10 13	4		
20. The student is able to modify or affirm his or her earlier value position, tentative judgment or decision regarding a social issue, based on adequate information about the values, needs and circumstances of parties involved, and adequate consideration of alternative solutions and their respective implications.	P I U H	P62 P63 P64	10 13	4		

COMPUTER EDUCATION

1. Values and computer education
1.1 Developing, clarifying and applying values

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
1.1.3 Expressing and acting on values						
1. The student knows examples of everyday actions one takes in various roles (as family member, consumer, student, etc.) which express or represent conscious value choices.	P I U H	K3 K7	9 10 11 13	2 4		(V) Participating (V) Judgment (V) Decision-making
2. The student knows ways one's value-based choices/actions may affect or become part of collective social decisions about computer-related issues or problems (e.g., voting; consumer decisions).	I U H	K3 K7	9 10 11 13	2 4		(V) Self-direction (V) Judgment (V) Decision-making
3. The student is able to relate personal choices/actions to their legal and ethical implications, and to their social consequences.	I U H	P24 P44 P51	9 10 11 13	2 4		(V) Integrity (V) Self-knowledge (V) Social responsibility (V) Self-direction
4. The student is able to make and act on choices and judgments which are consistent with legal and ethical obligations and with personally-held values.	I U H	P62 P65	9 10 11 13	4		(V) Social responsibility (V) Ethics (V) Integrity (V) Self-direction
5. The student is able to use appropriate computer-related devices and techniques to express personal values and insights (e.g., word processing to compose and edit written expression; computer graphics; games).	P I U H	P66 P67	8 9 10			(V) Self-expression (V) Creativity (V) Resourcefulness

COMPUTER EDUCATION

1. Values and computer education
1.2 Potential value choices

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
1.2.1 Values related to personal development						
1. The student values acquiring and refining knowledge and skills which enhance his or her effectiveness in a variety of life roles.	P I U H	V3	12	2 5		(V) Personal growth and development
2. The student values qualities that contribute to personal effectiveness in many life roles, including health, resourcefulness, curiosity, knowledgeability, insight, responsibleness, initiative, rationality, commitment, flexibility, self-discipline, aesthetic responsiveness.	P I U H	V3	8 11 12	2		(V) Aesthetic responsiveness (V) Self-discipline (V) Health (V) Resourcefulness (V) Curiosity (V) Knowledgeability (V) Insight (V) Responsibleness (V) Initiative (V) Rationality (V) Commitment (V) Flexibility
3. The student values qualities that enhance personal effectiveness at creative/productive tasks, including competence, efficiency, craftsmanship, ingenuity, judgment, innovativeness, creativity, openness, perseverence, imaginativeness.	P I U H	V3	8 9 11 12	5		(V) Competence (V) Efficiency (V) Craftsmanship (V) Ingenuity (V) Judgment (V) Innovativeness (V) Creativity (V) Openness (V) Perseverence (V) Imaginativeness

COMPUTER EDUCATION

1. Values and computer education
1.2 Potential value choices

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
1.2.1 Values related to personal development (cont.)						
4. The student values qualities that enhance relationships in family, school, social or work settings, including tolerance, appreciativeness, trust, thoughtfulness, sensitivity, respectfulness, individuality, dignity, integrity, morality, cooperativeness, honesty, friendliness.	P I U H	V3	8 9 11 12	2		(V) Friendliness (V) Morality (V) Integrity (V) Tolerance (V) Appreciativeness (V) Trust (V) Thoughtfulness (V) Sensitivity (V) Respectfulness (V) Individuality (V) Dignity (V) Honesty
5. The student values conditions of self-esteem and self-actualization, including: self-knowledge, self-reliance, self-direction, self-expression, self-fulfillment.	I U H	V3	8 9 11 12	2 4 5		(V) Self-knowledge (V) Self-confidence (V) Self-respect (V) Self-reliance (V) Self-direction (V) Self-expression (V) Self-fulfillment
6. The student values the ability to make responsible, rational and informed judgments, choices, and decisions.	P I U H	V3	10 12 13	4 5		(V) Decision-making (V) Judgment (V) Responsibleness (V) Rationality (V) Self-direction

COMPUTER EDUCATION

L. Values and computer education
1.2 Potential value choices

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
1.2.1 Values related to personal development (cont.)						
7. The student values behavior based on responsible, rational and informed judgments, choices, and decisions.	P I U H	V3	10 12 13	4 5		(V) Decision- (V) Judgment (V) Responsibleness (V) Rationality (V) Integrity
8. The student values his or her ability to recognize a variety of alternatives when solving problems or making decisions.	P I U H	V3	12 13	4 5		(V) Problem (V) Ingenuity (V) Creativity
9. The student values the ability to accurately predict consequences of alternative decisions and actions (e.g., probable effects on self, others, and environment).	P I U H	V3	12 13	4 5		(V) Predicting (V) Accuracy (V) Responsibleness (V) Problem solving
10. The student values accepting responsibility for the consequences of his/her decisions and actions.	P I U H	V3	12 13		11.2.1	(V) Responsible- (V) Autonomy (V) Respect for others
11. The student values privacy, and the rights to privacy of self and others.	P I U H	V3	11 13		11.1.4	(V) Privacy

COMPUTER EDUCATION

1. Values and computer education
1.2 Potential value choices

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
1.2.2 Computers and society: related values						
1. The student values computers as machines designed, built and operated by humans to assist in many tasks.	P I	V1 V2	8 12			(V) Invention (V) Tools
2. The student values the computer as a tool to record, manipulate and transmit information, to order and analyze data, and to simulate intelligence.	I U H	V2	9 12			(V) Tools
3. The student values contributions of computer systems and computer science to the expansion and verification of human knowledge, in every field of modern inquiry.	P I U H	V1 V2	8 9 12		9.3	(V) Cultural knowledge (V) Research (V) Experimentation
4. The student values roles of computers and computer science in meeting societal, institutional and personal needs (e.g., making full, accurate information available for relevant decisions, problem solutions, or inquiries by private individuals; handling routine data collection/processing/monitoring tasks efficiently).	I U H	V1 V2	9 11 12		9.1	(V) Tools (V) Access to resources

COMPUTER EDUCATION

1. Values and computer education
1.2 Potential value choices

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
1.2.2 Computers and society: related values (cont.)						
5. The student values computer systems, applications and uses which make informational resources readily available to individuals, or which help individuals process and use information effectively for personal decisions, tasks and activities.	I U H	V1 V2	8 9 11		8.10 9.3 9.6	(V) Access to resources (V) Knowledge of resources (V) Maintenance of resources (V) Educating (V) Communicating (V) Freedom of inquiry (V) Tools
6. The student values conditions and institutions which enable individuals to access and use the informational and aesthetic capabilities of modern computer systems.	I U H	V2	8 9 12			(V) Access to resources (V) Knowledge of resources (V) Schools (V) Educating (V) Communicating (V) Aesthetic responsiveness
7. The student values contributions of computers to both social change and social stability.	I U H	V2	12		9.1 10.3	(V) Flexibility (V) Stability
8. The student values computer applications and uses which are responsive to ethical principles and legal rights/responsibilities (e.g., protect privacy, security of individuals).	I U H	V2	11 12		8.1 8.4 9.1 9.4 9.9	(V) Ethics (V) Rule of law (V) Social responsibility (V) Social morality (V) Privacy

COMPUTER EDUCATION

1. Values and computer education
1.2 Potential value choices

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
1.2.2 Computers and society: related values (cont.)						
9. The student values computer applications/use which help make corporations, public agencies and other organizations more effectively responsive to the needs and interests of people they serve.	I U H	V2	11 12		9.	(V) Social responsibility
10. The student values computer applications and uses which help modern societies, institutions and/or individuals cope with change (e.g., future studies; projections which enable us to predict and take steps to prevent environmental deterioration).	I U H	V1 V2	12		9.	(V) Tools (V) Inquiring (V) Problem-solving (V) Predicting (V) Planning
11. The student values contributions of computer technology to the cultural arts, recreational and leisure activities of modern societies and individuals.	I U H	V2	8 9		9.5 9.8	(V) Cultural arts
12. The student values computer programs written for the convenience of the user(s).	U H	V1 V2	11 12	5	7.2	(V) Productivity (V) Clarity (V) Access to resources
13. The student values adequately prepared external and internal documentation (e.g., equipment documentation, software documentation).	U H	V2	11 12	5	7.2.1.7	(V) Clarity (V) Adequacy as basis for action or decision

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.1 Acquiring information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.1.1 Perceiving, experiencing						
1. The student knows that humans (and other living organisms) constantly receive and process information at various levels of consciousness.	P I	G2 K7	10			(V) Self-knowledge
2. The student is able to observe selectively according to his or her purpose or objective.	P I U H	P65	10			(V) Self-direction (V) Discrimination
3. The student is able to increase the amount or rate of information he or she receives through various channels (e.g., scanning, speed reading).	I U H	P65	10			(V) Openness (V) Self-discipline
4. The student is able to extend her or his attention span.	P I U H	P65	10			(V) Self-direction
5. The student is able to extend or alter his or her perception for various purposes (e.g., acquiring specific information unavailable through unassisted human senses; extending one's frame of reference as, for example, processing an entire book as if it were one string).	P I U H	P16 P65	7 10			(V) Personal growth and development (V) Competence

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving

2.1 Acquiring information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.1.2 Locating and using resources (See also: 3.3 Personal study skills)						
1. The student is able to use a variety of sources to acquire information (e.g., observation, stored information).	P I U H	P65	7 10	5		(V) Knowledge of resources (V) Resourcefulness (V) Competence
2. The student knows general categories of information sources available in his locality (e.g., museums, book collections, audio-visual collections, agencies, institutions, private organizations, computerized data bases/collections/retrieval systems).	P I U H	K5 K6	7 10	5		(V) Knowledge of resources (V) Resourcefulness (V) Competency
3. The student is able to identify local sources of information relative to purpose of inquiry (e.g., field trips or field observation sites, libraries, museums, resource people).	P I U H	P23 P33	7 10	5		(V) Knowledge (V) Resourcefulness (V) Competency
4. The student knows data bases and file collections accessible through computer time sharing for various inquiry purposes (e.g., ERIC, ORBIT, DIALOG)	I U H	K1 K2 K6	2 7 10			
5. The student knows data bases or files specialized for particular occupations or subject areas (e.g., LEXIS for lawyers, MEDLINE for doctors and health information).	U H	K1 K6	2 7 10	5		

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.1 Acquiring information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.1.2 Locating and using resources (cont.)						
6. The student knows type of search strategies, commands, etc. used with particular data bases, files or collections to which he or she has access.	I U H	K2	7 10	5		(V) Knowledgeability
7. The student is able to use and follow appropriate materials (thesaurus, manual, etc.) to address and search data files.	I U H	P41 P65	7 10	5		(V) Competence
8. The student is able to select and access appropriate data bases (e.g., Lockheed DIALOG, Bibliographic Retrieval Service, Systems Development Corporation's ORBIT).	I U H	P33 P66	7 10	5		(V) Resourcefulness
9. The student is able to employ appropriate research techniques when locating information sources (e.g., searching for related topic headings in indexes, catalogs, directories; using footnotes and bibliography as leads to related information; questioning resource people; using batch or interactive computer retrieval systems).	I U H	P41 P44 P65	7 10	5		(V) Competency (V) Efficiency (C) Efficiency
10. The student is able to use appropriate communication skills and conventions of courtesy when consulting a resource person.	I U H	P65 P74	5 7 10	1 5		(V) Respectfulnes (V) Integrity

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.2 Validating information						
1. The student knows ways in which scientific inquiry and validation differ from other ways of acquiring and checking knowledge (e.g., validating as much as possible by test against reality, rather than by feelings, values, ideologies, authorities, intuition; precise documentation, standardized measurements and terms).	I U H	K5	7 10			(V) knowledge of resources (V) Objectivity (V) Predictive validity
2. The student knows that validating information involves checking the accuracy, logical consistency, and relevance of data, and their adequacy (scope, completeness) as a basis for decision or action.	I U H	K2 K7 K9	7 10			(V) Accuracy (V) Logical consistency (V) Accuracy (V) Relevance (V) Adequacy
3. The student knows indicators of inadequate information or incomplete research (e.g., empty categories, confusing data, unexpected results of hypothesis test).	I U H	K3 K9	7 10		7.2.1.5	(V) Adequacy (V) Predictive validity
4. The student is able to determine the adequacy of procedures being used in an inquiry (e.g., is this strategy efficient? is it yielding the information I need?).	I U H	P24	7	5	7.2.1.3	(V) Adequacy (V) Predictive validity
5. The student is able to evaluate the adequacy (scope, completeness) of data as a basis for reaching conclusions (e.g., size and distribution of sample, time period covered, variables measured, controls used).	U H	P24	7 10	5		(V) Adequacy

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.2 Validating information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.2.1 Checking authoritativeness of sources						
1. The student knows ways of evaluating the authoritativeness of sources, including: (1) checking dates material was gathered, written, published; (2) checking professional reputation of author(s); (3) checking to see whether information communicated is really within the authority's area of expertise.	P I U H	K2	7 10 13	5		(V) Knowledgeability (V) Objectivity (V) Competence
2. The student is able to evaluate the authoritativeness of a source of information (e.g., book, film, individual communication).	P I U H	P21	7 10 13	5		(V) Judgment (V) Knowledgeability (V) Competence (V) Objectivity

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.2 Validating information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.2.2 Checking logical consistency, accuracy						
1. The student is able to evaluate the internal consistency and accuracy of data and conclusions communicated by others or acquired through personal experience.	P I U H	P22 P45	7 10 13	5	7.2.1.6	(V) Logical consistency (V) Accuracy (V) Competence (V) Judgment
2. The student is able to identify logical difficulties and inconsistencies (e.g., contradictions, incomplete sequences, unfounded inferences, inappropriate coding).	P I U H	P22	7 10 13	5		(V) Logical consistency (V) Accuracy
3. The student is able to identify irrelevant or inappropriate applications of principles, measurements, procedures, criteria, etc.	I U H	P22	7 10 13	5	7.2.1.6	(V) Accuracy
4. The student is able to identify conflicting data, interpretations, or definitions.	P I U H	P22	7 10 13	5		(V) Judgment (V) Accuracy
5. The student is able to recognize definitional statements (i.e., words or equations that specify the factors and relationships represented by a term or symbol).	P I U H	P22	7 10 13	5		(V) Competence
6. The student is able to recognize interpretative statements (e.g., hypotheses, generalizations, conclusions, theories, predictions).	P I U H	P22	7 10 13	5		(V) Competence

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.2 Validating information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.2.2 Checking logical consistency, accuracy (cont.)						
7. The student is able to detect data, conclusions or assertions that may be distorted by personal or institutional bias (e.g., cost/benefit studies intended to justify or to oppose installation of a given computer system).	U H	P22 P45	7 10 13	5		(V) Objectivity (V) Accuracy
8. The student is able to recognize assertions which are unsupported by accompanying data or references.	I U H	P22 P45	7 10 13	5		(V) Logical consistency (V) Judgment
9. The student is able to evaluate the validity of data used to support a conclusion (e.g., currency of data; procedures used to gather, record, and interpret it; relevance of data to conclusion).	I U H	P22 P45	7 10 13	5		(V) Competence (V) Accuracy
10. The student is able to detect organizational frameworks (models, classification systems) which distort or eliminate information (e.g., things in categories which do not have commonalities represented; representations of complex information in oversimplified model; definitions used inconsistently).	U H	P22 P45	7 10 13	5		(V) Logical consistency (V) Accuracy

2. Processes of inquiry and problem-solving
2.2 Validating information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.2.3 Checking relevance to purposes/objectives						
1. The student is able to distinguish between information which is relevant to an inquiry and that which is not.	P I U H	P23 P45	5 7 13			(V) Relevance
2. The student knows factors to consider in evaluating the relevance of information, including: subject of inquiry, degree of accuracy needed, level of specificity or generality needed.	P I U H	K9	5 7 13			(V) Relevance (V) Accuracy
3. The student is able to evaluate the relevance of new information to the purpose and subject of an inquiry.	I U H	P23	5 7			(V) Relevance (V) Objectivity
4. The student is able to determine the adequacy of information at each stage of inquiry (information gathering, validating, organizing, interpreting, acting upon).	I U H	P24	7 10	5		(V) Adequacy (V) Competence

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.3 Organizing information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.3.1 Labeling, naming, numbering, coding						
1. The student is able to use accurately conventional systems and terms for labeling or naming objects, materials, categories, etc.	P I U H	P31	7 10			(V) Competence (V) Accuracy (V) Clarity
2. The student is able to use accurately conventional numbering systems and symbols.	P I U H	P31	7 10			(V) Competence (V) Accuracy
3. The student is able to code information according to a conventional system (e.g., computer language, flow chart, key sort).	I U H	P31	7 10			(V) Clarity
4. The student is able to devise codes or systems for personal organization, storage, and retrieval of information.	P I U H	P31	7 10			(V) Competence (V) Innovativeness

2. Processes of inquiry and problem-solving
2.3 Organizing information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.3.2 Recording, listing						
1. The student is able to record information in a variety of ways (e.g., written notes, tape recordings, audio-visual media, video tape, etc.).	P I U H	P32	7	5		(V) Competence
2. The student is able to select and use recording systems appropriate to the subject, the conditions under which he or she is working, and the intended use of the information.	P I U H	P32	7 10	5		(V) Competence
3. The student is able to use a variety of forms for recording observational or experimental data (e.g., graphs, tables, check lists, notes).	P I U H	P32	7 10			(V) Competence (V) Resourcefulness
4. The student is able to record information accurately and clearly.	P I U H	P32	7 10			(V) Accuracy (V) Clarity

2. Processes of inquiry and problem-solving
2.3 Organizing information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.3.3 Classifying, grouping, categorizing (See also: 2.4.5 Comparing, contrasting, discriminating)						
1. The student is able to categorize representations (words, pictures, symbols, statements, etc.) by similarities in form, meaning, use, or other criteria.	P I	P33	7 10			(C) Classification (V) Competence
2. The student knows meanings of the terms subcategory, subset, subgroup, etc.	P I U H	K1 K2	7 10			
3. The student is able to classify a set of objects or representations into parallel subcategories (e.g., outline, Warnier-Orr diagram).	P I U H	P33	7 10			(C) Classification
4. The student is able to distinquish between parallel and nonparallel categories in a classification system.	P I	P33 P45	7 10			(C) Classification (V) Order (V) Competence
5. The student is able to distinquish between exclusive and overlapping categories.	P I	P33 P45	7 10			(C) Classification (V) Order (V) Competence
6. The student is able to distinquish among various levels of specificity in a classification system.	P I	P33 P45	7 10			(C) Classification (V) Competence
7. The student is able to categorize information according to conventional classification schemes (e.g., outline, taxonomy, table, pert chart).	I U H	K2	7 10			(V) Competence

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.3 Organizing information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.3.3 Classifying, grouping, categorizing (cont.)						
8. The student is able to select and use classification schemes or models appropriate to the data being organized and to its intended use.	U H	P33	7 10		3.2.2	(V) Competence
9. The student is able to modify classification schemes as needed to accommodate new or complex information and to facilitate clarity or accuracy of communication.	P I U H	P33 P65	7 10			(V) Competence

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.3 Organizing information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.3.4 Ordering, sequencing						
1. The student is able to order information alphabetically or in chronological sequence.	P I	P34	7 10			(V) Order (V) Competence
2. The student is able to represent experimental or observational data in an appropriate sequence (e.g., time line, line graph).	P I U H	P34	7 10		3.2.2	(V) Order

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.3 Organizing information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.3.5 Manipulating, arranging, transforming, computing (See also: 3.2 Mathematical skills)						
1. The student is able to manipulate or arrange experimental or observational data according to an appropriate organizational scheme.	P I U H	P35	7 10			(V) Resourcefulness (V) Competence (V) Accuracy
2. The student is able to use conventional mathematical operations needed to organize or interpret data.	P I U H	P35 P65	7 10	5		
3. The student is able to do accurate computations based on standardized formulas, equations, etc.	I U H	P35 P65	7 10	5		(V) Accuracy
4. The student is able to select and use appropriate resources and equipment to aid computation (e.g., tables, calculators, computers).	U H	P35 P65	7 10 13		5.	(V) Knowledge of resources (V) Tools
5. The student is able to translate information accurately from one form of representation to another (e.g., translate words to symbols and symbols to words).	P I U H	P35	7 10	5		(V) Accuracy

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.3 Organizing information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.3.6 Estimating						
1. The student is able to make logical estimates based on available information.	P I U H	P36	7 10	4 5		(V) Logic (V) Competence
2. The student is able to revise or adjust estimates.	I U H	P36	7 10	4 5		(V) Competence
3. The student knows ways in which logical estimations can add to the efficiency of research strategies (e.g., verification through checkpoint estimates, rather than following).	P I U H	K7 K8	7 10	1		(V) Efficiency
4. The student is able to estimate results of calculations.	P I U H	P36	7 10	5		

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.3 Organizing information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.3.7 Summarizing, abstracting						
1. The student is able to abstract needed information from experimental or observational data.	P I U H	P36	7 10			
2. The student is able to summarize information contained in experimental or observational data.	P I U H	P37	7 10			(V) Generalization
3. The student is able to construct logical and coherent summaries.	P I U H	P37	7 10			(V) Generalization (V) Competence (C) Documentation
4. The student is able to annotate summaries as needed to document sources of information (e.g., footnotes, bibliographic notes).	I U H	P37	7 10			
5. The student is able to select and use conventional forms, materials, and procedures useful for storing and retrieving summarized or abstracted information (e.g., computer citations, index cards, notebooks, tapes).	I U H	P37	7 10			

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.4 Interpreting information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.4.1 Decoding symbols (See also: 3.1.1 Reading)						
1. The student is able to decode accurate information from written/printed words, symbols, and mathematic and scientific notations.	P I U H	P41	3 7 10	5		(V) Literacy (V) Competence (V) Self-reliance (V) Symbols
2. The student is able to decode accurate information from charts, maps, three-dimensional models, and pictorial and graphic representations.	P I U H	P41	3 7 10	5		(V) Literacy (V) Competence (V) Self-reliance (V) Symbols
3. The student is able to decode accurate information from electronic signals and representations.	U H	P41	3 7 10	5		

COMPUTER EDUCATION

2. Process of inquiry and problem-solving
2.4 Interpreting information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.4.2 Inferring, interpolating, extrapolating						
1. The student is able to draw logical inferences that account for all factors in a situation.	P I U H	P42	7 10	5		(V) Judgment
2. The student is able to distinguish between logical and illogical inferences including sequences and cause/effect.	P I U H	P42 P45	7 10	5		(C) Causality (C) Logic (V) Judgment
3. The student is able to select and use appropriate conventional aids to accurate interpolation or extrapolation of data (e.g., calculators, slide rules, reference tables, computers).	H	P42 P65	5 7 10			(V) Tools
4. The student is able to calculate mathematical probabilities.	H	P42	5 7			

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.4 Interpreting information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.4.3 Analyzing						
1. The student is able to identify constituent parts of a whole.	I U H	P43	7 10			(V) Insight
2. The student is able to use accurate terms for analytical systems, models, or procedures (e.g., quantitative, qualitative; static, dynamic; system analysis; statistical analysis; chemical analysis; linquistic analysis).	U H	P43 P65	7 10			
3. The student is able to select and use criteria appropriate to the subject and purpose of an analysis.	U H	P33 P43 P65	7 10 13			(V) Relevance
4. The student knows procedures involved in analysis of data (e.g., organizing, relating, comparing, interpolating, extrapolating).	U H	K2	7 10 13		11.8.3	(C) Organization
5. The student is able to analyze data according to selected or specified procedures and criteria.	U H	P43 P65	5 7 10			(C) Analysis
6. The student is able to select and use effectively technological aids to analysis (e.g., lab equipment, data processing equipment, measurement instruments, dynamic models).	U H	P33 P45 P65	5 7 10			

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.4 Interpreting information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.4.4 Associating, relating, equating (See also: 3.2.2 Measurement and statistical skills)						
1. The student is able to relate terms or symbols accurately to their formally or popularly-defined referents.	P I U H	P41 P44	7 10	3 5		(V) Relativeness
2. The student is able to associate or relate accurately data about real factors in a situation.	P I U H	P44	7 10	3 5		
3. The student is able to relate, associate, and equate data about a situation represented in different forms (e.g., picture with written description; verbal definition with equation).	P I U H	P44	7 10	3 5		(V) Insight
4. The student is able to relate accurately data from various sources.	P I U H	P44	10	3 5		
5. The student is able to use conventional operations and procedures to accurately relate, associate, and equate information (e.g., mathematics, experimentation, logic, analytic models).	I U H	P44	7 10	3 4 5		
6. The student is able to relate information about situations to appropriate criteria for acting or deciding.	I U H	P44	10	3 5		

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.4 Interpreting information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.4.5 Comparing, contrasting, discriminating						
1. The student knows ways of refining the accuracy and usefulness of one's comparisons and discriminations (e.g., measurement, documentations; use of accurate comparative terms, problem-solving procedures).	I U H	K2 K7	10 12	5		(V) Inquiring (V) Competence (V) Insight (V) Resourcefulness
2. The student knows that comparing, contrasting, and discriminating are key processes at all stages of inquiry or problem-solving (e.g., acquiring, evaluating, organizing, interpreting, and applying information; deciding, acting, communicating).	I U H	G2 K7	10 12	5		(V) Problem-solving
3. The student is able to represent comparisons in a variety of forms (e.g., verbal description, illustration, measurement units).	P I U H	P45 P66	10 12	5		
4. The student is able to use comparative terms (e.g., greater than, less than; larger than, smaller than; older than, newer than).	P I	P45 P65	10 12	5		
5. The student is able to identify similarities and differences in objects, representations, concepts, etc.	P I	P33 P45	10 12	5		
6. The student is able to use conventional systems of documenting or quantifying comparisons (e.g., standardized measurements, classifications, vocabulary).	P I U H	P45	10 12	5		

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2. Processes of inquiry and problem-solving
2.4 Interpreting information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.4.5 Comparing, contrasting, discriminating (cont.)						
7. The student is able to compare or contrast comparable data from several sources, holding constant the selection principle or frame of reference.	P I U H	P45	10			
8. The student is able to compare predictions with outcomes.	P I U H	P45	10 12	5		

2. Processes of inquiry and problem-solving
2.4 Interpreting information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.4.6 Synthesizing						
1. The student is able to discover new information from reorganization of data about related factors (e.g., relating, synthesizing).	I U H	P46	3 6 10	5		
2. The student is able to use mathematical operations accurately for synthesizing a multi-dimensional measurement from single-dimensional measurement from single-dimension measurements (e.g., determine volume from linear measurements; calculate scalar quantities).	P I U H	P46	3 6 10	5		
3. The student is able to select and use standard forms and operations which are appropriate to the subject and purpose of a synthesis.	U H	P46	3 6 10	5		
4.. The student is able to synthesize information into representations which are accurate, adequate, and relevant to the reality they represent.	P I U H	P46	6 10	5		(V) Accuracy (V) Adequacy (V) Relevance

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.4 Interpreting information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.4.7 Testing against standards or criteria						
1. The student knows ways criteria vary in levels of generality or specificity (e.g., levels of classification scheme; concept of accuracy vs. specification of tolerances for particular measurements).	I U H	G2 K5	7 10 12	4 5	7.2.1.6	(V) Problem-solving (V) Competence
2. The student is able to use effectively standardized or conventional criteria for organizing and interpreting information (e.g., classifying, measuring, analyzing, discriminating).	P I U H	P47	7 10 12	4 5		
3. The student is able to test the validity of experimental or observational data against specified criteria (e.g., use statistical analysis programs).	P I U H	P47	3 7	4 5		(V) Competence
4. The student is able to test alternative choices, judgments or decisions against personally selected criteria (e.g., set significance levels for statistical testing of hypotheses).	I U H	P47	3 7	4 5	7.2.1.6	(V) Judgment
5. The student is able to state the criteria by which he or she is testing information.	P I U H	P47 P66	3 7	4 5		
6. The student is able to select and use appropriate conventional methods, materials, and instruments for testing representations against stated criteria.	I U H	P47 P65	3 7 10	4 5		(V) Relevance

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.4 Interpreting information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.4.8 Generalizing						
1. The student is able to formulate logical generalizations from experimental or observational data (e.g., manipulating data structures, using simulation programs).	I U H	P48	3 7	3 5		(V) Logical consistency
2. The student is able to apply generalizations which are appropriate to the subject and purpose of a deductive inquiry.	H	P48	7 10	3 5		(V) Relevance (V) Judgment (V) Logic (V) Competence
3. The student is able to formulate logical generalizations or conclusions from extensions of representations (e.g., extrapolated statistics, higher mathematics, theoretical models, computer simulations).	H	P48	7 10	3 5		(V) Logic (V) Models (V) Tools (V) Competence
4. The student is able to state tentative generalizations (hypotheses) to be tested in a particular inquiry.	P I U H	P48	3 4	3 5		(V) Competence

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.5 Using information to produce new information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.5.1 Theorizing, predicting (See also: 11.1 Algorithms)						
1. The student is able to specify meanings of the terms and symbols used within personally-developed propositions or theories.	I U H	P51	4 7 10	4 5		(V) Clarity
2. The student is able to use terms and symbols consistently within a personally developed proposition or theory.	I U H	P51	4 9 10	4 5	7.2.1.4	(V) Logical contency
3. The student knows purposes served by theoretical models (e.g., organizing, clarifying, extending concepts; illustrating for communication).	U H	G2 K3	3 4 9	4 5		(V) Communicating (C) Models
4. The student is able to develop a theoretical model.	U H	P51	4 9	4 5		(C) Models
5. The student knows how a theory or proposition is "proven" scientifically by its predictive validity (i.e., its adequacy as a basis for consistently accurate prediction).	U H	G1 K9	3 4	4 5	2.2	(V) Predictive validity
6. The student is able to make logical predictions based on a scientific theory or proposition.	I U H	P51	4 7 10	4 5		(V) Competence (V) Predicting
7. The student is able to make logical predictions based on data (e.g., projections, trends, extrapolations).	I U H	P51	4 7 10			(V) Predicting

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.5 Using information to produce new information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.5.2 Formulating hypotheses (See also: 2.4.8 Generalizing)						
1. The student is able to develop a hypothesis inductively (e.g., propose relationships which would logically account for observed effects).	I U H	P52	7 9 10	3 5		(V) Competence (V) Problem-solving (V) Logic
2. The student is able to deduce a hypothesis from theory, theoretical principles or propositions (e.g., determine which proposition would apply to a situation, predict effects which if observed would validate proposition).	U H	P52	7 9 10	3 5		(V) Competence (V) Logic
3. The student is able to relate a personally-developed hypothesis to observations and assumptions on which it is based.	U H	P44 P52	7 9 10	3 5		
4. The student knows criteria for a testable hypothesis (e.g., variables can be identified, or controlled, and measured with tools available; conditions specified can be obtained; observed effects can be documented in communicable form; test can be replicated by others).	U H	K9	7 10 12	3 5		
5. The student is able to determine whether or not a hypothesis is testable within existing constraints.	U H	P23	7 10 12	3 5		
6. The student is able to formulate a testable hypothesis.	U H	P23	7 10 12	3 5		

2. Processes of inquiry and problem-solving
2.5 Using information to produce new information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.5.2 Formulating hypotheses (cont.)						
7. The student is able to state a hypothesis in a conventional form (e.g., if___, then____, given____.).	U H	P52 P66	7 10 12	3		(V) Logic (V) Models

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.5 Using information to produce new information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.5.3 Testing hypotheses						
1. The student knows factors which determine how a hypothesis will be tested, including: (1) variables and conditions specified in the hypothesis; (2) resources available; (3) knowledge, skills, and ingenuity of the tester.	I U H	K8 K9	5 10	4 5		(V) Logic (V) Models (V) Inquiring (V) Problem-solving (V) Knowledgeability (V) Research
2. The student is able to select appropriate instruments and procedures to guide a systematic observation (e.g., checklist, time schedule).	P I U H	P33 P53	5 10	4 5		
3. The student is able to use appropriate instruments and procedures to document observations (e.g., recording equipment, measurement tools and techniques).	P I U H	P32 P53	5 7	4 5		
4. The student is able to interpret experimental and observational data according to appropriate principles and procedures.	I U H	P47 P63	5 7 10	4 5		
5. The student is able to evaluate test finding (e.g., compare findings with prediction, determine whether they support hypothesis, direct its revision, or indicate need for further testing).	P I U H	P47 P54	5 7 10	4 5		(V) Judgment
6. The student is able to test effectively a personally-developed hypothesis (e.g., state hypothesis, design).	I U H	P53	5 7 10	4 5		(V) Self-direction (V) Self-fulfillment

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.5 Using information to produce new information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.5.4 Revising hypotheses						
1. The student is able to use logical principles in revising a hypothesis (e.g., prior to testing, to improve logical consistency, adequacy; after testing, to accommodate new information).	P I U H	P54	7 10	5		(V) Logic (V) Models (V) Problem-solving (V) Knowledgeability (V) Relevance
2. The student is able to recognize test findings which indicate that a hypothesis should be revised (e.g., unexpected results of carefully controlled test).	P I U H	P54	7 10	5		(V) Discrimination (V) Insight
3. The student is able to use information yielded by a hypothesis test as a basis for revising a hypothesis.	P I U H	P54	7	5		(V) Resourcefulness

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.6 Acting on the basis of information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.6.1 Making decisions (See also: 1.1.3 Expressing and acting on values)						
1. The student knows characteristics of effective decisions (e.g., based on adequate, accurate, relevant information; relevant values used as standards; predictive validity: outcomes tend to meet needs to which decision was addressed).	I U H	K3	10 12 13	4 5	2.2	(V) Planning (V) Adequacy (V) Accuracy (V) Relevance (V) Predictive validity (V) Problem-solving (C) Decision-making
2. The student knows conventional procedures for arriving at rational and informed decisions (e.g., acquire adequate information, determine or formulate options, predict outcomes, determine desirability of alternative outcomes, select alternative).	I U H	K2 K7	10 12 13	4 5	2.2	(V) Knowledgeability (V) Models
3. The student is able to identify conditions and constraints within which a personal decision is to be made (e.g., problem or objective, resources available, time constraints, situational norms, people and things to be affected by one's decision).	P I U H	P62	10 12 13	4 5		(V) Knowledgeability (V) Responsibleness (V) Rationality
4. The student is able to predict logical outcomes of alternatives being considered for a personal decision (e.g., what is likely to occur if course X is followed).	P I U H	P62	10 11 13			(V) Insight (V) Responsibleness

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.6 Acting on the basis of information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.6.1 Making decisions (cont.)						
5. The student is able to evaluate decision alternatives according to relevant criteria (e.g., practicality, efficiency, relevance to purpose or objective, desireability of predicted outcome).	P I U H	P62	10 12 13	4 5	2.2	(V) Resourcefulness (V) Self-reliance (V) Self- direction
6. The student is able to prioritize decision alternatives according to various criteria (e.g., ease of execution, economy, efficiency, short-term value, long-term value to self or others).	I U H	P62	10 12 13	4		
7. The student is able to revise alternatives as needed to accommodate new information or maximize effectiveness of a decision.	P I U H	P54 P62	10 12 13	4 5		(V) Adaptability
8.. The student is able to make decisions (i.e., select an alternative) after thoughtful consideration of options, predicted outcomes, and implications for those affected by the decision.	P I U H	P62	10 12 13	4 5	1.1.3	(V) Judgment (V) Responsibleness

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.6 Acting on the basis of information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.6.2 Solving problems (See also: 7.2.1.1 Problem definition, 7.2.1.3 Problem refinement)						
1. The student is able to determine whether or not a problem has a computer solution; (i.e., whether the solution can be implemented on a computer).	P I U H	P45 P63	5 10 12	4 5	7.2.1.3	(V) Problem-solvi (V) Knowledge-ability (V) Resourcefulness (V) Discrimination
2. The student knows steps common to problem-solving strategies, including: (1) problem recognition; (2) definition, clarification, analysis of recognized problem elements; (3) research-gathering, validating, interpreting related factual information; (4) consideration of alternatives; (5) selection of an alternative; (6) implementation; (7) evaluation of outcomes.	P I U H	K2 K4	10 12	5	7.2.1.3	
3. The student knows ways in which the use of scientific processes contributesto effective problem-solving (e.g., reducing confusion, uncertainty; allowing accurate prediction; providing means of testing intuitive or speculative ideas).	P I U H	K2 K7 K8	10 12	5		(V) Cultural skills
4. The student is able to select procedures (conventional scientific processes) to be used at various stages of problem solution (e.g., hypothesis testing to validate proposed solution).	P I U H	P33 P63	10 12	4 5		(V) Competence

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.6 Acting on the basis of information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.6.2 Solving problems (cont.)						
5. The student is able to revise problem-solving strategies as needed to maximize effectiveness of procedures or solutions.	P I U H	P63	10 12	4 5	7.2.1.3	(V) Personal growth and development (V) Self-reliance (V) Adaptability-flexibility
6. The student knows ways scientists and educators have developed and promoted formal strategies for problem-solving, each based on scientific constructs which have proved useful in a wide variety of problem situations.	I U H	G2 K2 K4	10 12	4 5		(V) Inquiring (V) Problem-solving (C) Models
7. The student is able to select and use a formal problem-solving strategy which is appropriate to the nature of the problem, and which may be used with the resources available.	P I U H	P33 P63	10 12	4 5		(V) Models (V) Relevance (V) Adequacy
8. The student is able to combine elements of various conventional problem-solving models when working toward a solution (e.g., statistical analysis of experimental results; top-down problem-solving to arrive at a solution followed by role playing to check feasibility of the solution).	U H	P33 P63	9 10 12	4 5		(V) Ingenuity (C) Models

2. Processes of inquiry and problem-solving
2.6 Acting on the basis of information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.6.2 Solving problems (cont.)						
9. The student knows principles upon which system analysis procedures are based (e.g., existence of systems; commonalities among natural, social, and technological systems; utility of describing wholes in terms of interactions among their parts; need to identify factors and relationships as completely and accurately as possible before deciding or acting).	I U H	G1 K2	3 4	4 5		(C) System
10. The student is able to use system analysis procedures in conventional sequence: state needs, define objectives, identify constraints, review alternatives, select an alternative which best meets needs, implement alternative, receive feedback, evaluate, modify procedures until objectives are met satisfactorily.	I U H	P63	3 4 10	4 5		
11. The student is able to select and use appropriate resources for analyzing and resolving personal conflicts (e.g., counselors, publications, programmed materials).	I U H	P33 P63	3 4 10 12	4 5	1.1	

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.6 Acting on the basis of information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.6.3 Encoding prior to communication (See also: 2.3 Organizing information; 2.7 Communicating information; 3.1 Language and communication skills)						
1. The student is able to decide on format, media, and style to be used to communicate information clearly and accurately to the intended receiver(s).	P I U H	P62 P66	10	5		
2. The student is able to select terms, symbols, and illustrations to convey information clearly and accurately to the intended receiver(s).	P I U H	P33 P66	10	5		
3. The student is able to encode information to be stored and retrieved via electronic or mechanical data processing systems; (e.g., computer, key sort).	U H	P66	5	5	7.2.1.4	
4. The student is able to write computer programs.	H	P66	5 10	5	7.2	

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving
2.6 Acting on the basis of information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.6.4 Creating						
1. The student is able to construct models.	P I U H	P67 P76	3 7	5		(V) Creativity (V) Self-expression (V) Communicating (V) Resourcefulness (V) Self-fulfillment (V) Enjoyment
2. The student is able to manipulate objects into a variety of positions or designs.	P I U H	P67	7 8	5		
3. The student is able to initiate ideas, procedures, activities, etc. related to an inquiry or problem-solving situation.	P I U H	P67	7 10 12	4 5		See goal 1. Also: (V) Initiative
4. The student is able to create computer related programs or applications.	U H	P66 P67	7 9 10			(V) Creativity (V) Innovativeness

COMPUTER EDUCATION

2. Processes of inquiry and problem-solving

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
2.7 Communicating information (See also: 3.1 Language and communication skills and subheadings)						
1. The student is able to write reports according to specified criteria.	P I U H	P66 P75	7 10	4 5		(V) Communicating (V) Clarity (V) Accuracy
2. The student is able to give directions clearly and accurately.	P I U H	P74	7 10	1		
3. The student is able to participate effectively in group inquiries or problem solutions (e.g., contribute ideas, work cooperatively).	P I U H	P65	10 11	1 5		(V) Cooperating (V) Participating (V) Democratic process
4. The student is able to make effective use of modern telecommunication systems (e.g., telephone, data communication systems, television).	P I U H	P65	7 10	5	2.1.1 8.10 9.6	(V) Communicating (V) Resourcefulness (V) Competence

COMPUTER EDUCATION

3. Basic education and computer education
3.1 Language and communication skills

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
3.1.1 Reading						
1. The student knows reasons why skills in locating, selecting, and interpreting written or printed information are essential to effective use of computers.	P I U H	K8 K9	10	2 5		(V) Competence (V) Resourcefulness (V) Literacy
2. The student knows principles and procedures used to decode written or printed words.	P	P41 P65	10	5		
3. The student is able to apply basic perception skills to reading (e.g., visual-motor coordination, concentration).	P	P41 P65	10	5		
4. The student is able to use standard references to clarify meanings of unfamiliar words (e.g., dictionary, thesaurus, glossary).	P I U H	P41 P65	10	5		(V) Competence (V) Resourcefulness
5. The student is able to clarify ideas by relating written text and accompanying illustrations, tables, maps, etc.	P I U H	P41 P44	10	5		(V) Clarity (V) Accuracy
6. The student knows that meanings of words, phrases, etc. may be clarified as one attempts to record and organize information.	P I U H	G2 K8	10	5		
7. The student is able to clarify meanings of words, phrases, etc. through communication with others.	P I U H	P65 P74	10	5		
8. The student is able to follow written directions or descriptions having progressive degrees of complexity (e.g., manuals).	P I U H	P61	10	5		(V) Competence

COMPUTER EDUCATION

3. Basic education and computer education
3.1 Language and communication skills

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
3.1.1 Reading (cont.)						
9. The student is able to evaluate the adequacy, accuracy, and logical consistency of information contained in reading materials (e.g., check scope and methods of research which produced data and conclusions; detect unsupported statements, distortions, omissions, over-simplifications, bias).	I U H	P22	10	5		(V) Resourcefulness (V) Competence (V) Rationality (V) Judgment (V) Logic

COMPUTER EDUCATION

3. Basic education and computer education
3.1 Language and communication skills

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
3.1.2 Writing						
1. The student knows the importance of writing skills to personal effectiveness (e.g., ability to communicate clearly, maintain social contacts over distance, record and organize personal thoughts).	P I U H	K8	7 10	2		(V) Communicating (V) Personal growth and development (V) Competence (V) Self-expression
2. The student knows the importance of writing skills to career effectiveness (e.g., applying for jobs, sending clear messages, writing reports).	P I U H	K8	7 10	3 5		(V) Personal growth and development (V) Competence (V) Literacy
3. The student knows technical skills which aid effective writing (e.g., ability to write legibly, organize materials and ideas; spelling, punctuation, grammar skills; proof-reading, editing skills).	P I U H	K2	7 10	5		(V) Competence (V) Communicating (V) Literacy (V) Craftmanship
4. The student is able to choose language, style and format that are appropriate to the purpose, audience, and subject of his or her writing.	P I U H	P21 P75	7 10	5		(V) Communicating (V) Discrimination (V) Flexibility (V) Self-expression
5. The student is able to organize his or her material in a logical sequence as determined by the subject, purpose, and audience.	P I U H	P34 P75	7 10	5		(V) Clarity (V) Craftmanship
6. The student is able to use word processing equipment to compose and edit text.	I U H	P66	7 10	5		(V) Efficiency

COMPUTER EDUCATION

3. Basic education and computer education
3.1 Language and communication skills

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
3.1.2 Writing (cont.)						
7. The student is able to proofread rough and final copies of written work, documentation and programs.	I U H	P47 P75	7 10	5		(V) Competence (V) Self-respect (V) Craftmanship
8. The student is able to write reports or research papers according to specified conventions or criteria.	I U H	P75	7 10	8		(V) Competence
9. The student is able to select and use appropriate illustrations, diagrams, graphs, or other displays to accompany the text of a written report.	I U H	P75	7	8		(V) Discrimination (V) Resourcefulness (V) Creativity

3. Basic education and computer education
3.1 Language and communication skills

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
3.1.3 Speaking and listening (See also: 2.7 Communicating information)						
1. The student is able to use words accurately in conversations, speeches or discussions; (i.e., select and use terms that do, in standard usage, refer to the things he or she means to talk about).	P I U H	P66 P74	10	5		(V) Accuracy (V) Clarity (V) Competence
2. The student is able to present ideas or information clearly in conversation or discussion, using appropriate grammatical construction and connecting ideas so the listener(s) can follow them.	P I U H	P74	10	5		(V) Clarity (V) Competence
3. The student is able to ask logical and relevant questions to clarify meaning, extend information, or assist reasoning in conversation or discussion.	P I U H	P65 P74	10	5		(V) Rationality (V) Sensitivity (V) Logical consistency
4. The student is able to use appropriate strategies to clarify meaning of what is heard (e.g., questioning, paraphrasing, feedback, conversation, locating and using supplementary information).	P I U H	P12 P65	10	5		(V) Clarity (V) Resourcefulness (V) Communicating
5. The student is able to follow spoken directions.	P	P12	10	5		
6. The student is able to listen selectively for instructions, main ideas, supporting details, etc. which are relevant to his or her current interests, purposes, informational needs or tasks.	P I U H	P12 P23 P45	10	5		(V) Discrimination (V) Competence (V) Resourcefulness

COMPUTER EDUCATION

3. Basic education and computer education
3.1 Language and communication skills

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
3.1.3 Speaking and listening (cont.)						
7. The student is able to use definitions, examples, descriptions, comparisons and re-statements to explain difficult terms or ideas to listeners.	I U H	P74	10	5		(V) Clarity

3. Basic education and computer education
3.2 Mathematical skills

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
3.2.1 Arithmetic skills						
1. The student knows the place value represented by each digit in a whole or decimal number.	P I U H	K2	10	5		(V) Competence (V) Knowledgeability
2. The student is able to write mathematical symbols correctly, observing conventions of placement and form needed to accurately represent numerical values, operations or relationships.	P I U H	P75	10	5		(V) Competence (V) Accuracy
3. The student is able to estimate answers to simple addition, subtraction, multiplication, or division problems.	P I U H	P51	10	5		(V) Resourcefulness (V) Efficiency
4. The student is able to add, subtract, multiply and divide whole, decimal, and fractional numbers.	P I U H	P35 P63	10	5		(V) Competence
5. The student is able to translate word problems into equivalent mathematical equations.	P I U H	P35	10	5		(V) Competence (V) Resourcefulness
6. The student is able to select the appropriate mathematical formulas or operations for the solution of common problems.	P I U H	P33 P35	10	5		(V) Competence (V) Resourcefulness (V) Problem-solving
7. The student is able to use electronic computing aids.	P I U H	P65	10	5		(V) Competence (V) Resourcefulness (V) Efficiency (V) Tools

COMPUTER EDUCATION

3. Basic education and computer education
3.2 Mathematical skills

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
3.2.1 Arithmetic skills (cont.)						
8. The student is able to locate and use standard reference media and indexes to obtain information pertaining to the application of mathematics.	U H	P41 P63	10	5		
9. The student is able to state a problem in his or her own words.	I U H	P37 P66	10	5		
10. The student is able to formulate mathematical statements that describe problem situations.	I U H	P31 P35 P63	10	5	7.2.1.2	

3. Basic education and computer education
3.2 Mathematical skills

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
3.2.2 Measurement and statistical skills						
1. The student knows functions of objective, standardized measurements (units, instruments, principles, procedures, symbols) in the lives of individuals and societies (e.g., reducing or resolving uncertainty about physical, psychological, social phenomena; enabling development of technological, economic systems).	I U H	K7	7 10	5		(V) Cultural skills (V) Cultural knowledge (V) Knowledgeability (V) Tools (V) Inquiry (V) Competence (V) Problem-solving
2. The student knows terms associated with accuracy of measurement including tolerance, precision, relative error, and greatest possible error.	I U H	K1 K2	7 10	5		(V) Accuracy (C) Accuracy
3. The student is able to use appropriate units, instruments, procedures and symbols for measuring or representing physical or spatial properties of objects.	P I U H	P45	7 10	5		
4. The student is able to determine equivalent measures within systems using a guide or conversion table (e.g., kilometers, meters).	I U H	P35 P44	7 10	5		
5. The student is able to perform basic arithmetic operations (+, -, x, ÷) with measures (e.g., 3 hours, 45 minutes + 2 hours, 20 minutes = 6 hours, 5 minutes).	P I U H	P35	7 10	5		

3. Basic education and computer education
3.2 Mathematical skills

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
3.2.2 Measurement and statistical skills (cont.)						
6. The student knows terms and definitions associated with statistical inference, and ways they are related to "common sense" ideas about detecting errors, determining what caused what, etc. (e.g., reliability, validity, correlation, regression, distribution, level of confidence, level of significance, standard error).	U H	K1 K2 K10	7 10	5	7.2.1.5	
7. The student knows principles and procedures used for various types of statistical sampling (e.g., random sampling, matched test and control sampling).	U H	K2	7 10	5		
8. The student is able to construct line segment graphs, charts and bar graphs to represent numerical data.	U H	P35	7 10	5		
9. The student knows the characteristics of the normal distribution.	U H	K2 K3	7 10	5		
10. The student knows the common measures of central tendency of data, such as mean, median, mode, percentile, variance.	U H	K2	7 10	5		
11. The student is able to calculate such statistics as standard deviations, variances, mean, median and mode.	H	P35	7 10	5		

COMPUTER EDUCATION

3. Basic education and computer education
3.2 Mathematical skills

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
3.2.2 Measurement and statistical skills (cont.)						
12. The student is able to interpret statistical terms, symbols and displays.	U H	P41	7 10	5	2.5.3	
13. The student knows meanings of basic terms of probability (e.g., sample, sample point, sample space, event, experimental results, probability of an event).	U H	K1 K2	7 10	5		

COMPUTER EDUCATION

3. Basic education and computer education

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
3.3 Personal study skills						
1. The student is able to function as an independent learner.	P I U H	P65	10	5		(V) Responsibleness (V) Self-direction (V) Self-reliance
2. The student is able to identify tasks that need to be accomplished.	P I U H	P62	10	5		(V) Planning
3. The student is able to identify elements of a task or goal (i.e, analyze a situation or problem-determine separate components to be dealt with; constraints on time, resources, etc.)	P I U H	P43	10	5		(V) Planning (V) Efficiency
4. The student is able to identify persons in the classroom, the school, or vicinity who could be of help on a project.	P I U H	P63	10	5	2.1.2	(V) Resourcefulness
5. The student is able to schedule his or her working time according to the task(s) to be done, and the constraints under which he or she is working (e.g., deadlines; times that needed facilities or materials are accessible).	P I U H	P65	10	5		(V) Planning (V) Self-direction
6. The student is able to set realistic and appropriate goals related to classroom performance.	P I U H	P65	10	5		(V) Planning (V) Problem-solving (V) Self-reliance (V) Self-respect

4. Computer systems

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
4.1 Characteristics of computer systems						
1. The student knows the major components of computer systems and their functions (e.g.,hardware, software, documentation).	P U I H	K3 K7	3			(C) System
2. The student is able to distinquish among hardware, firmware, and software in computer systems.	P I U H	P45	3			
3. The student knows relationships among computer hardware, software, documentation, and the user.	P I U H	K5 K7 K10	3			
4. The student knows that computers are machines designed, built, and operated by humans to assist in many tasks.	P I U H	K3	2 12	4		
5. The student knows ways computers contribute to both social change and social stability.	I U H	K7 K8	6 12			(C) Change (C) Social change (C) Social stabilit
6. The student knows characteristics of various computer systems (e.g.,real time, time-sharing, batch processing, interactive processing).	P I U H	K3	3		6.3.2	(C) System
7. The student knows features and capabilities of microcomputer systems as compared to features and capabilities of large data processing systems.	P I U H	K3 K5	3 5			(C) System
8. The student knows meanings and uses of the term "cybernetics."	U H	K1 K3 K7	3		8. 9.	

4. Computer systems

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
4.1 Characteristics of computer systems (Cont.)						
9. The student knows uses of the computer as a tool to record, manipulate, store and transmit information, to order and analyze data, to simulate intelligence, and to control machinery.	I U H	K3 K7	7 12	5	8.	(V) Tools
10. The student knows the basic operations of a computer system, including input, processing and output of data or information.	P I	K3 K7	3 7	5		(C) Systems
11. The student knows how people may access computers, including: (a) via a keyboard terminal, at the site of the computer or at any distance via telephone lines; (b) via punched or marked cards; (c) via tape, diskette or other magnetic media.	P I	K2 K7	3 7	5		(V) Access to resources
12. The student knows meanings of terms and concepts basic to the understanding or use of computers (e.g., data, information, code, communication, library).	P I	K1 K2 K3	3			(C) Communication (C) Information
13. The student knows capabilities and requirements of computers (e.g., store data, transform data by means of set of pre-defined rules; must be given instructions to operate; program written in program language provides instructions).	P I	K3 K7	3			

COMPUTER EDUCATION

4. Computer systems
4.2 Using computer systems

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
4.2.1 Operating procedures						
1. The student knows the difference between system commands and program statements (e.g. LIST, RUN vs. LET, GO TO, INPUT).	P I U	K5	3 5 7			
2. The student knows the system commands for the specific system being used.	P I U H	K2	3 5 7			
3. The student knows tasks typically done with library programs (simulations, business programs, math and science computations, computer assisted instruction, text editing, artistic creation).	P I U H	K7	3 5		8.	
4. The student knows tasks that can be done using systems programs (e.g. compiling, editing, copying, sorting).	P I U H	K7	3 5 7			
5. The student is able to use system commands.	P I	P35	3 5			
6. The student is able to select, retrieve and execute computer library programs.	P I	P35	3 5			

COMPUTER EDUCATION

4. Computer systems
4.2 Using computers

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
4.2.2 Appropriate use of computer systems						
1. The student knows factors to consider when deciding whether or not to use the computer for a particular task (e.g. purpose, time and resource constraints, ethical or moral considerations, relevance).	I U H	K3 K5 K7 K9	7 10 11 13	5	1.1.3 2.6.1 8. 9.	(V) Judgment
2. The student knows characteristics of information processing tasks which make the computer an advantageous tool (e.g. need for rapid or repetitive processing, mass data storage or complex computations).	I U H	K3 K9	3 5 9 13	5		
3. The student is able to determine the appropriateness of tasks to computer solution. (e.g. existance of programs, cost effectiveness, time effectiveness).	I U H	P24 P47	10 11 13	5	1.1.3 2.6.1 8. 9.	(V) Judgment
4. The student knows that the comparative advantages of various computer applications and systems will vary as technology advances.	I U H	K3 K5 K8	1 5 6 13	3 4	8. 9.	(C) Change (C) Technology (C) Efficiency

4. Computer systems
4.2 Using computers

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
4.2.3 Using computer programs						
1. The student knows correct procedures to locate and use pre-existing programs in order to solve specific problems.	U H	K2 K6	3 7			
2. The student is able to read documentation necessary to operate computing equipment.	P I U H	P23 P41	3 7		3.1.1 7.2.1.7	
3. The student is able to develop, code, and execute a program which produces valid output.	I U H	P35 P75	3 7		7.2	
4. The student is able to read computer print-outs.	P I	P41	3 7		3.1.1	
5. The student is able to select, interpret and use relevant data from computer print-outs when making decisions or solving problems.	P I U H	P43 P62 P63	3 7		1.1.3 2.6.1 2.6.2	
6. The student knows causes of inaccuracies in the results from computer runs (e.g. round-off error, "garbage in/garbage out").	I U H	K7 K8	3 7		7.2.1.5	(C) Accuracy
7. The student is able to generate test data to use in the comparison of alternate programs.	U H	P43 P47	3 7		7.2.1.6	
8. The student is able to incorporate existing library subroutines into a program being developed.	U H	P35	3 5 7		7.2	
9. The student is able to use program documentation to select and use library programs for specific tasks.	I U H	P24 P41	3 5 7		7.2.1.7	(C) Documentation

COMPUTER EDUCATION

4. Computer systems
4.2 Using computers

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
4.2.3 Using computer programs (cont.)						
10. The student is able to use program documentation to interpret the output of library programs.	I U H	P41 P42	3 7		7.2.1.7	(C) Documentation
11. The student is able to use program documentation in order to modify a program in such a way that it will solve a slightly different problem using a similar procedure (e.g., modify a function in a plot program).	I U H	P41 P63	3 7		7.2.1.7	(C) Documentation

5. Calculators

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Con
5.1 Description						
1. The student knows that calculators are electronic tools designed, built, and used by humans.	P I	G2 K2 K3	1	1		
2. The student knows that the calculator is a tool to be used in doing difficult computations.	P I	K2 K7	7 12	4 5		
3. The student knows that calculators are forms of computers.	P I	G2 K3	7	3 4		
4. The student knows components of a calculator.	P I U H	K3	3	3 4		
5. The student knows ways calculators can be used in problem solving and extending mental activities.	P I U H	V	7 12	3 4		
6. The student knows similarities and differences between electronic calculators and older calculating devices (e.g., counting frames, abacus, Napier's bones, slide rules, electric adding machines).	P I U	K5	3 4	3 4	10.1	
7. The student knows similarities and differences between programmable calculators and computers.	P I	K5	3 4	3 4		
8. The student knows similarities and differences between programmable and nonprogrammable calculators.	P I	K5	3 4	3 4		

COMPUTER EDUCATION

5. Calculators

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
5.1 Description (cont.)						
9. The student is able to replace batteries or recharge a calculator without damaging the instrument.	P I	P35	7	5		
10. The student knows possible safety hazards involved in storing or handling calculators.	P I	K3 K6	7			

COMPUTER EDUCATION

5. Calculators
5.1 Description

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
5.1.1 Functions						
1. The student knows potentials and limitations of calculators (e.g., quick calculations, limited display capacity).	I U	K3 K7	3 7	4 5		
2. The student knows similarities and differences in the functions among electronic calculators.	P I	K5 K7	3	4 5		
3. The student knows functions available on a personal calculator.	P I U	K7	3 7	4 5		
4. The student knows occupational areas for which specialized hand-held calculators have been developed (e.g., real estate, navigation, finance, science).	I U	K3 K7	5 7 10	4 5		
5. The student knows several functions available on special purpose calculators (e.g., checkbook, statistical, trigonometry, registers).	I U	K3 K7	5 7 10	4 5		
6. The student knows criteria used to select calculators suitable for specific uses.	I U	K3 K9	7 10	4 5	9.3 9.6	
7. The student knows reasons for the purchase of a particular calculator for personal use (e.g., rechargable batteries, size of display, appropriate functions).	I U	K3 K9	7 10	4 5	9.3 9.6	

COMPUTER EDUCATION

5. Calculators

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
5.2 Calculator operation						
1. The student is able to distinguish the symbols on a calculator.	P D	P33 P45	3 7	5		
2. The student is able to push the desired keys when using a calculator (e.g., use finger control, coordination).	P I D	P35	7	5		
3. The student knows the function(s) of each calculator key.	P I	K2 K7	7	4 5		
4. The student is able to translate mathematical statements into series of steps suitable for solution on a calculator.	P I U H	P42 P46	7 8 10	5		
5. The student knows calculators have operating procedures which may differ with various makes of machines.	I	K2 K5	3	4 5		
6. The student is able to apply the order of operations rules when using a calculator to solve problems. (e.g., do multiplication/division before addition/subtraction, follow calculator's hierarchy of operations).	I U	P35	7 10	5	3.2	
7. The student knows criteria for determining suitability of a problem for solution using a calculator.	P I U	K9	7	4 5	3.2	
8. The student is able to read and use calculator operator's manuals.	I U	P41	7 10	4 5	3.1.1	

5. Calculators

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
5.2 Calculator operation (cont.)						
9. The student is able to use calculators with different input modes. (e.g., Algebraic, reverse polish notation, business hybrid).	I	P35 P42 P63	7 10	4 5		
10. The student is able to use a calculator's memory to facilitate problem solving (e.g., using constants, storing intermediate results, following a formula).	P I U	P35	7 10	4 5		
11. The student is able to do integer and decimal calculations on a calculator.	P I U	P35	7	4 5		
12. The student knows limitations of calculator computation. (e.g., limited display, truncation-- $(1 \div 3)x3$ may not equal 1 on some calculators).	I U	K3	7	4 5		
13. The student knows types of problems solvable with the aid of a calculator.	I U	K3 K9	3	4 5		
14. The student knows procedures for translating appropriate algorithms for use on programmable calculators.	I U	K3 K7	7 10	4 5		
15. The student knows types of special calculators, their functions and uses.	I U H	K2 K7	7		5.1.1.4.	

COMPUTER EDUCATION

5. Calculators

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
5.2 Calculator operation (cont.)						
16. The student is able to use functions available on special purpose calculators as an aid to problem solution (e.g., trigonometry functions to solve trigonometric equations).	I U H	P35 P65	7 10	5		

5. Calculators

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
5.3 Calculator interpretation						
1. The student is able to read a display on a calculator.	P I U	P41	7	5		
2. The student is able to check calculator results with quick mental estimates for reasonableness.	P I U	P35 P41	7	4 5		
3. The student knows sources of calculator errors (e.g., hardware failures, overload indications, reading and/or keying errors, rounding errors).	P I U	P43 P47	3 7	4 5		(C) Accuracy
4. The student knows scientific notation as used on calculators.	I U	P41	7	5		
5. The student is able to translate a calculator display given in scientific notation to conventional notation.	I U	P35 P41 P66	7	5		

COMPUTER EDUCATION

6. Computer hardware

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
6.1 General information (See also 4.1 Characteristics of computer systems)						
1. The student knows that computer hardware refers to the physical components of computer systems.	P I U H	G2 K1 K3	3			
2. The student knows the major components of a computer, including input equipment, memory unit, control unit, arithmetic unit, and output equipment.	P I U H	K3	3			
3. The student knows characteristics of computer equipment produced by various manufacturers (e.g., cost, speed, compatability).	I U H	K3 K5	3			
4. The student knows the historical trends in size, cost, and capability of computers.	I U H	K3 K4	1		10.2 10.3	
5. The student knows the characteristics of first, second, and third generation hardware. (It is unclear whether a fourth generation exists).	U H	K3 K5	1 3 7		10.2 10.3	
6. The student knows the hardware components of a telecommunications system (e.g., terminals, modems, multiplexors).	I U H	K3	3		8.10	
7. The student knows procedures for initiating, executing and ending computer operation (log on/log off, program execution and termination).	P I U H	K2	3			

6. Computer hardware
6.2 Hardware components

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
6.2.1 Arithmetic and logic units, registers, and processors						
1. The student knows the major components of computer systems (e.g., input, output, memory, arithmetic, control).	I U H	K3	3 4			
2. The student knows the functions of registers in a computer (e.g., accumulating, program countering, shifting).	I U H	K7	3 4			
3. The student knows the functional composition of a computer hardware system (e.g., a group of separate machines that are put together with a control device to form a computer system).	U H	K3 K7	3 4			
4. The student knows characteristics/concepts which distinguish analog electronics from digital electronics.	U H	K3 K5	3 4 5 7		6.4	
5. The student knows the function of various electronic circuits used in analog computers (e.g., add, subtract, multiply, divide, compare, integrate).	I U H	K3 K7	3			
6. The student knows examples of special-purpose computers (e.g., video games, calculators, missile guidance systems).	P I U H	K3	3 5 7			

6. Computer hardware
6.2 Hardware components

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
6.2.2 Auxiliary equipment						
1. The student knows characteristics and uses of common peripheral devices (e.g., hard copy terminal, cathode ray tube terminal, card reader, line printer, plotter, disk/tape drive).	I U H	K3 K7	3 5 7			
2. The student knows factors to consider when selecting peripheral devices appropriate to the storage and work area requirements of a program and its data.	U H	K3 K7 K9	3 5 7			
3. The student is able to use appropriate peripheral devices for particular tasks.	I U H	P16 P66	3 5 7			

6. Computer hardware
6.2 Hardware components

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
6.2.3 Circuit elements						
1. The student knows the function of standard logic circuits (e.g., AND, OR, NAND, NOR, inverter, flip-flop, half adder).	U H	K7	3 4			
2. The student knows that standard logic circuits can be used to develop complex circuits (e.g., adders, comparitors, input/output drives, central processing unit).	U H	K3 K7	3 4 8			
3. The student knows ways in which the development of complex circuits has led to simplification in design of electronic systems (e.g., calculators, consumer appliances, computers).	P I U H	K8	1 3 4 8		10.2 10.3	

COMPUTER EDUCATION

6. Computer hardward
6.2 Hardware components

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
6.2.4 Control units						
1. The student knows that the control unit of a digital computer is composed of a number of simple components.	I U H	K3	3 4			
2. The student knows that control units decode and execute machine language instructions.	I U H	K7	3 4			
3. The student knows some circuits are designed to control input-output devices. (e.g., USARTS---universal synchronous asynchronous receiver transmitter; UARTS---universal asynchronous receiver transmitter; disk controllers).	U H	G2 K7	3 4			

COMPUTER EDUCATION

6. Computer hardware
6.2 Hardware components

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
6.2.5 Input-output devices						
1. The student knows devices commonly used to input and output computer information (e.g., terminal, tape reader, card punch, audio tape unit).	P I U H	K3 K7	3 4 7			
2. The student knows characteristics of input/output devices. (e.g., teleprinter, cathode ray tube).	P I U H	K3 K5	3 4 7			
3. The student knows characteristics and capabilities of different types of input and output devices.	P I U H	K3 K5 K8	3 4 7			
4. The student knows advantages and disadvantages of using particular input or output devices for specific purposes.	P I U H	K7 K8	3 4 7			
5. The student knows various types of computer terminal displays (e.g., cathode ray tube, storage tube, plasma panel).	I U H	K3	3 4			
6. The student knows characteristics and functions of various computer terminal displays.	I U H	K7	3 4			
7. The student is able to use computer input/output devices to store, process, and display data.	P I U H	P35 P66	7			

6. Computer hardware
6.2 Hardware components

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
6.2.6 Memory storage						
1. The student is able to distinguish between sequential and random access computer storage devices.	I U	P45	3 7			
2. The student knows various computer storage devices and their uses.	I U H	K3 K7	3 7			
3. The student knows characteristics/capabilities of secondary storage systems (e.g., audio cassette, digital cassette, magnetic tape, floppy disk, hard disk).	I U H	K3 K7	3 7			
4. The student knows characteristics/capabilities of various types of primary memory systems (e.g., core, RAM, ROM, PROM, BUBBLE).	I U H	K3 K7	3 7			

6. Computer hardware

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Co
6.3 Computer logic						
1. The student knows the operational logic of circuits that perform arithmetic operations or conversions (i.e., half adders, full adders, A to D converters, comparitors).	U H	K7	3			
2. The student knows how standard logic circuits can be used to develop complex circuits (e.g., adder, comparitor, input/output controller, central processing unit).	I U H	K3 K7	3 4 7 8		6.2.3	
3. The student knows that information in digital computers is stored as electrical representations of zeros and ones.	P I	G2 K7	3 4 7		6.1	
4. The student knows that digital computers operate by a series of gates transmitting an on state or an off state. (Different computers implement these states different ways.)	P I U H	K3 K7	3			

COMPUTER EDUCATION

7. Computer software

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.1 Description						
1. The student knows that computer software refers to the programs required to use computer hardware (e.g., operating systems, compilers, interpreters, applications programs, file and data base programs).	P I U	K1 K2 K3	3 4			
2. The student is able to identify the language of the software being used.	P I U H	P41	3 7			

COMPUTER EDUCATION

7. Computer software
7.2 Programming techniques

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.2.1 General programming information						
1. The student knows that computer programs are sets of sequential instructions which accurately perform many problem solving activities (e.g., sorting, listing, calculating).	P I	G2 K1 K4 K7	3			
2. The student knows basic programming procedures or steps (e.g., defining the problem, developing an algorithm, coding the program, documenting the program, locating and correcting errors).	I U H	K2 K4 K7	3	3	4.2.3	(C) Algorithm
3. The student knows the importance of logical structure, economy of storage and economy of computing time when programming.	I U H	K6 K9	12	3		(C) Efficiency (V) Efficiency
4. The student is able to use programming procedures (e.g., loops, subroutines, data structures).	I U H	P66	3 4 7			

COMPUTER EDUCATION

7. Computer software
7.2 Programming techniques
7.2.1 General programming information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.2.1.1 Problem definition (See also: 2.6.2 Solving problems; 11.1 Algorithms)						
1. The student is able to determine the steps required in the solution of a problem.	P I U H	P43 P63	4 5 10			
2. The student is able to restate a problem in terms of its structural components (e.g., required information, necessary algorithm or tasks, desired output).	I U H	P63 P67	4 5 7			(C) Algorithm (V) Resourcefulness
3. The student knows a definition of "algorithm" and of "heuristic."	I U H	K1	3			
4. The student is able to develop appropriate algorithms for problem-solving situations.	I U H	P63 P67	4 5 6 8 10			
5. The student knows criteria on which to compare alternative algorithms (i.e., speed, memory size, complexity).	U H	K8	4 5 7			(C) Efficiency
6. The student is able to select appropriate algorithms for various problem-solving situations.	I U H	P33 P63	4			(C) Efficiency
7. The student is able to represent an algorithm in a graphical manner (e.g., flowchart, Warnier-Orr).	I U H	P66 P76	3 7			(C) Algorithm
8. The student is able to determine computer capabilities necessary to execute a program.	U H	P24 P35 P44	7			

7. Computer software
7.2 Programming techniques
7.2.1 General programming information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.2.1.2 Data specification						
1. The student knows distinquishing characteristics of different data types (e.g., integer data, floating point data, alphanumeric data).	I U H	K3 K5	4 7 10			
2. The student is able to define logical records which contain different data types.	I U H	P43 P66	4 7		2.1.2	
3. The student is able to store and retrieve data using serial or random access files.	I U H	P35	3 4 7			
4. The student is able to use arrays for temporary storage and manipulation of data within programs (e.g., matrix functions).	I U H	P34 P35	3 4 7			
5. The student is able to use pointer variables to store and retrieve data.	U H	P34 P35	3 4 7			
6. The student is able to use queues and stacks to store and retrieve data.	U H	P34 P35	3 4 7			
7. The student is able to produce readable and informative output through use of appropriate formatting.	U H	P35 P76	4 7 8		2.1.2	

COMPUTER EDUCATION

7. Computer software
7.2 Programming techniques
7.2.1 General programming information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.2.1.3 Problem refinement						
1. The student knows that a primitive is a basic step in solving a problem applicable to computer programming which can be expressed in one line of computer code.	I U H	K1	4			(V) Problem solving
2. The student knows that a primitive cluster is a basic step, or group of steps, in solving a computer programming problem that can be expressed directly into computer code/programming language.	I U H	K1 K2	4 7			
3. The student is able to refine a problem into a set of primitives or primitive clusters.	I U H	P43 P66	4 7			(V) Problem solving
4. The student is able to select a problem solving method which takes into account ease of data entry and user convenience.	U H	P63 P66	3 4 7			(V) Judgment
5. The student is able to use standard procedures to segment a complex problem into several smallerand more manageable problems.	I U H	P43 P63 P76	3 4 7			(V) Problem solving
6. The student is able to modify or select an algorithm to make efficient use of the computer that will execute the program (e.g., its speed, memory size, complexity).	U H	P35 P63 P67	3 7 8			(C) Efficiency
7. The student is able to refine an algorithm to make efficient use of the language in which the algorithm will be expressed.	U H	P35 P63 P67	3 7 8			(C) Efficiency

COMPUTER EDUCATION

7. Computer software
7.2 Programming techniques
7.2.1 General programming information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.2.1.3 Problem refinement (cont.)						
8. The student is able to trace a program to investigate program errors.	I U H	P63	3 7			

COMPUTER EDUCATION

7. Computer software
7.2 Programming techniques
7.2.1 General programming information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.2.1.4 Coding (See also: 7.3 Programming languages and subheadings)						
1. The student knows that the function of coding is the transforming of primitives or primitive clusters into a given computer language.	I U H	K7	3 4			
2. The student is able to translate an algorithm into code.	I U H	P41 P66	3 4 5			
3. The student knows that programming languages have syntax (structure) and semantics (meaning).	I U	G2 K2 K3	3 4 5			
4. The student knows the syntax of the programming language being used.	I U H	K2 K3	3 4 5			
5. The student is able to determine the format and function of the language and the meaning of language elements from descriptions in a programming manual.	U H	P41	3 4 7		2.3.1	
6. The student knows the syntax and semantics of various computer programming languages.	I U H	K3	3 4 7			

7. Computer software
7.2 Programming techniques
7.2.1 General programming information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.2.1.5 Locating and correcting errors						
1. The student is able to use error messages and documentation to locate and correct syntax errors in a computer program.	I U H	P41 P47	3 4 7			(V) Problem solving
2. The student is able to use standard procedures to locate and correct logic errors in computer programs (e.g., intermediate output, computer tracing, manual tracing).	I U H	P22 P47	3 4 7			
3. The student knows sources of errors in programs (e.g., round-off errors, overflow and underflow errors, syntax and logic errors).	I U H	K3 K5 K10	3 4			
4. The student is able to estimate for correctness of computer printouts.	I U H	P22 P36 P66	3 7			(V) Accuracy
5. The student is able to trace a program through its listing for the purpose of locating and correcting errors.	U H	P22 P47	3 7		7.2.1.3	

COMPUTER EDUCATION

7. Computer software
7.2 Programming techniques
7.2.1 General programming information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.2.1.6 Testing computer programs						
1. The student is able to test a computer program for computational accuracy by using data with known output (e.g., textbook examples, pre-verified calculations).	I U H	P22 P47	3 7			(V) Accuracy
2. The student is able to design data to test various facets of a computer program (e.g., valid and invalid data to test all transfer of control statements, data to test output formating).	I U H	P22 P47 P66	3 7		2.2.2 2.4.7	(V) Rationality
3. The student knows that checking results for correctness is part of the problem-solving process.	I U H	G2 K2 K9	3 7			(V) Accuracy (V) Problem solving

COMPUTER EDUCATION

7. Computer software
7.2 Programming techniques
7.2.1 General programming information

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.2.1.7 Documentation						
1. The student knows functions of documentation (e.g., assist in correcting errors, analyze an algorithm, modify a program, inform user of program capabilities and running procedures).	I U H	K7	3 4			(C) Documentation
2. The student knows varieties of internal and external documentation.	I U H	K2 K5	3			(C) Documentation
3. The student is able to provide documentation to facilitate the modification of programs (e.g., comments within the program, program and system flowcharts, variable definition tables, descriptive text).	I U H	P66	3 7			
4. The student is able to provide documentation to facilitate use of a program (e.g., "help" commands, user's manual).	I U H	P66	3 7			
5. The student knows the importance of adequately prepared internal and external documentation.	I U H	K9	3 8 11		1.2.2	(V) Utility (C) Documentation
6. The student is able to make use of documentation when operating computing equipment.	P I U H	P23 P41	3 7			

7. Computer software
7.2 Programming techniques

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.2.2 Strategies						
1. The student knows that a structured program has a linear structure consisting of consecutive instructions or modules.	I U H	K2 K3 K4	3 4 7			(C) Structure
2. The student knows elements of structured programming (e.g., concatenation, selection, repetition, ease).	I U H	K3	3 4 7			
3. The student knows strategies of program design including top down, bottom up and spontaneous code.	I U H	K2 K3 K7	3 4 7			
4. The student knows that top down programming involves subdividing a problem into parts until the problem is expressed in either primitives or primitive clusters.	U H	K2 K7	3 4 7			
5. The student knows advantages and disadvantages of top-down programming, bottom-up programming, and spontaneous coding.	U H	K3 K5	3 4 7			

7. Computer software
7.3 Programming languages

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.3.1 Components of computer language (See also: 7.2.1.4 Coding)						
1. The student knows functions of data manipulation statements (e.g., movement of data, computations).	I U H	K2 K7	3 4 7			
2. The student knows functions of input and output statements.	P I U H	K3 K7	3 7			
3. The student knows functions and forms of branching statements (e.g., decision, iteration).	I U H	K3 K7	3 4 7			
4. The student knows characteristics and function of an iterative process (e.g., counting, summing).	I U H	K3 K7	3 4 7			
5. The student knows characteristics and purposes of subroutines and functions in programming languages.	U H	K3 K7	3 4 7			
6. The student knows characteristics and functions of data arrays in programming languages.	I U H	K3 K7	3 4 7			
7. The student knows form and function of variables in computer languages.	I U H	K3 K7	3 4 7			
8. The student knows characteristics of machine languages, assembler languages, and high level languages (e.g., machine and assembler languages provide for comprehensive control of the computer; higher level languages are more like mathematical or natural language).	I U H	K3	3 4 7			

7. Computer software
7.3 Programming languages

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.3.2 Higher level languages						
1. The student knows characteristics of high level programming languages.	P I U H	K3	3 4 7			

7. Computer software
7.3 Programming languages
7.3.2 Higher level languages

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.3.2.1 Language structure						
1. The student is able to use input, output, data manipulation, arithmetic operations, and branching constructs in a high level language.	I U H	P35 P66	3 4 7			
2. The student is able to use programming techniques involving an iterative process (e.g., counters, summation).	I U H	P66	3 4 7			
3. The student is able to use programming techniques involving functions and subroutines.	I U H	P66	3 4 7			
4. The student is able to use arrays.	I U H	P66	3 4 7			
5. The student is able to analyze, construct, and evaluate arithmetic expressions using the hierarchy of operations of a high level language.	I U H	P22 P43	3 4 7			
6. The student knows form and functions of constants, numeric variables and alphanumeric variables in a high level language.	I U H	K2 K3 K7	3 4 7			
7. The student is able to use appropriate statements of a high level language to format input and output data.	I U H	P66	3 4 7			

COMPUTER EDUCATION

7. Computer software
7.3 Programming languages
7.3.2 Higher level languages

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.3.2.2 Orientation of languages						
1. The student knows orientations of a variety of high level languages.	U H	K3 K6 K7	3 7			
2. The student knows characteristics and purposes of business-oriented languages (e.g., provisions for multiple precision arithmatic; provisions for report generating).	U H	K3 K7	3 7			
3. The student knows characteristics and purposes of scientific/numeric languages (e.g., wealth of mathematical constructs).	U H	K3 K7	3 7			
4. The student knows characteristics and purposes of string oriented languages (e.g., built-in special functions that allow easy manipulation of strings).	U H	K3 K7	3 7			
5. The student knows characteristics and purposes of structured programming languages (e.g., well defined control structures facilitate the writing of modular code).	U H	K3 K7	3 4			

COMPUTER EDUCATION

7. Computer software
7.3 Programming languages

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.3.3 Machine and assembler language						
1. The student knows characteristics common to assembler and machine languages.	U H	K3	3 4 7			
2. The student knows that each assembler and machine language is unique to a specific type of processor.	U H	K3	3 4 7			
3. The student knows the organizations of machine and assembler languages as they relate to design of the processor, address mode, control structure, data storage, etc.	U H	K2 K3 K7	3 4 7			
4. The student knows the syntax and sematics of machine and assembler languages.	U H	K2 K3	3 4 7			
5. The student is able to use routines written in machine or assembler language programs.	U H	P22 P41 P66	3 7			
6. The student is able to link machine or assembler routines with high level language routines.	U H	P35 P67	3 4 7			
7. The student is able to write programs in assembler and machine language.	U H	P66	3 7			
8. The student is able to write computer programs in machine and assembler language which involve various addressing modes (e.g., indirect addressing, direct addressing, use of index registers, relative addressing, absolute address-	U H	P66 P67	3 7			

COMPUTER EDUCATION

7. Computer software
7.3 Programming languages
7.3.3 Machine and assembler languages

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.3.3.1 Translators						
1. The student knows characteristics of various translators (e.g., assemblers, compilers, interpreters).	U H	K3	3 4			
2. The student knows relative merits of compilers vs. interpreters (i.e., compilers create machine code; interpreters run more slowly than compilers but usually allow the program to be stopped and altered during a run).	U H	K5	3 4			

COMPUTER EDUCATION

7. Computer software
7.3 Programming languages
7.3.3 Machine and assembler languages

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
7.3.3.2 Operating systems						
1. The student knows various types of programs that are available in an operating system, including supervisors, input/output control, translators, sort-merge generators, data converters, system tests, storage managers, schedulers.	U H	K2 K3	3 7			
2. The student knows functions of an operating system (e.g. monitoring user programs, managing system resources).	U H	K7	3 7			
3. The student knows the functions, advantages, and disadvantages of different operating systems (e.g., timesharing, batch processing, real time processing, multiprogramming).	U H	K5 K7 K8	3 7			

8. Computer applications

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.1 Artificial intelligence						
1. The student knows characteristics that distinguish machine simulated artificial intelligence from human intelligence.	I U H	K5	3 4			
2. The student knows the Turing test for machine intelligence.	I U H	K1 K9	3 5			
3. The student knows major areas of artificial intelligence including work that has been or is being done, and what progress has been made (e.g., playing games of strategy, proving mathematical theorems, problem solving, recognizing visual and auditory patterns, processing natural languages, robotics).	I U H	K4 K6	1 3 4 5 10			
4. The student knows characteristics of techniques employed in many problem-solving oriented artificial intelligence programs (e.g., an initial state to describe the start of a problem, a goal state which describes the end of the problem, operators and evaluation functions which facilitate progress from the initial state to the goal state).	H	K3 K7	3 5			
5. The student knows searching strategies employed in many game playing artificial intelligence programs (e.g., depth-first, breath-first, minimax, and alphabeta).	U H	K2 K3 K7	3 5			

COMPUTER EDUCATION

8. Computer application

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.1 Artificial intelligence (cont.)						
6. The student knows applications of artificial intelligence (e.g., industrial robots, hospital inpatient interviewing, medical diagnosis).	I U H	K7	4 5			
7. The student knows implications of artificial intelligence for the future, including the possibility of artificially intelligent machines performing differently from the purposes for which they were programmed.	I U H	K8 K10	4 5		9.1 9.9	
8. The student is able to analyze issues related to the appropriate use of artificial intelligence.	H	P24 P45	9 11 13		1.1.2 4.2.2	

COMPUTER EDUCATION

8. Computer application

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.2 Data acquisition/monitoring/ process control						
1. The student knows examples of data adaptable to computer processing (e.g., item prices, production counts, temperature, pressure, light intensity).	I U	K3 K7	5			
2. The student knows common type of digital data collection devices (e.g., punched card readers, optical scanners, counters, etc.).	I U	K2	3 5			
3. The student knows common analog measuring devices (e.g., thermometer, voltmeter, light meter).	I U	K2	3 5			
4. The student knows terms related to monitoring and process control, including feedback, control, off-line computer controlled system, closed-loop computer controlled system, digital, analog, digital to analog converter, analog to digital converter.	I U H	K1	5			
5. The student knows the characteristics of a computer-directed monitoring system (e.g., acquisition, recording, summarizing, and reporting of data).	I U H	K3	3 5			(V) Resourcefulness (V) Objectivity
6. The student knows common applications of a monitoring system (e.g., inventory, prices, earth movement, weather).	I U H	K7	3 4 5			

8. Computer applications

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.2 Data acquisition/monitoring/ process control (cont.)						
7. The student knows characteristics of a process control system. (e.g., acquisition of data, testing of data, taking appropriate action based on data).	U H	K2 K3	3 5			
8. The student knows that a monitoring or process control system may require analog to digital conversion (e.g., temperature reading for alarm testing by a digital computer).	U H	K3	3 5			
9. The student knows common applications of process control (e.g., quality control, checking for alarm situations, industrial production).	U H	K3 K7	5			

8.- Computer applications

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.3 Graphics						
1. The student knows that computer graphics involves the use of a computer to generate and display drawings, graphs, and charts.	P I U H	K2 K3	5 8			
2. The student knows that computer systems can produce music and speech.	P I U	G2 K3 K7	5 8			
3. The student is able to use conventional steps in transforming a picture into computer output including deciding on the output design, drawing the picture on graph paper, deciding on a programming technique, and coding the program.	I U H	P34 P41 P66 P76	5 7 8			
4. The student is able to use programming techniques for converting pictures to computer output (e.g., explicitly specifying each line, looping a series of duplicate lines, using data values to specify occurrence of characters, filling arrays with characters before output, and describing with equations).	I U H	P41 P66 P76	5 7 8			
5. The student knows factors to consider when writing a program to generate graphical output (e.g., features of the language, output device, programming technique).	I U H	K7 K9	5 7 8			
6. The student knows graphic facilities available in various languages (e.g., Terminal Control Language added to FORTRAN by Tektronix and the SET command added to BASIC by Radio Shack).	U H	K2 K6	3 5			

8. Computer applications

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.3 Graphics (cont.)						
7. The student knows characteristics distinquishing whole page graphing from single line graphing (i.e., whole page--a 2-dimensional array is specified, filled with characters and output; single line--a 1-dimensional array is specified, filled with characters and output).	U H	K5	3 5			
8. The student knows examples of computer graphics applications, including art, mathematical models, television, movies, engineering design.	U H	K2 K3 K7	4 5 8			
9. The student knows components of computer devices that support graphics either directly or through appropriate programming (e.g., line printers, terminals, cathode ray tubes, storage tubes, plotters).	I U H	K3 K7	3 5			
10. The student knows ways the properties/limitations of cathode ray tubes affected the development of computer graphics.	U H	K6 K7	1 3		10.2	
11. The student knows characteristics of hard copy graphics display equipment.	I U H	K3	3 5			
12. The student knows characteristics and functions of various types of graphics display terminals (e.g., printer, cathode ray tube, storage tube, plasma panel).	U H	K3 K7	3 5 7			

COMPUTER EDUCATION

8. Computer applications

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.3 Graphics (cont.)						
13. The student is able to distinguish between graphical input devices that are best for positioning new items on the screen and those that are best for pointing at items already on the screen (e.g., joysticks and light pens).	U	P45	3 7			
14. The student knows properties of transformations performed on a graphics display including translating, scaling and rotating.	H	K7 K10	3		3.2	
15. The student knows methods used to control part of a graphics display which lies off the screen (e.g., scissoring and clipping).	H	K7	3 5 7			
16. The student knows characteristics of depth cues used to program 3-dimensional graphics, including perspective, wire-frame drawing, hidden line elimination, shading, intensity cues and stereoscopic views.	H	K3	3 5 7			
17. The student knows techniques used in computer graphics to accept pictorial input through digitized representation.	U H	K7	5 7			
18. The student knows various computer uses as an art medium.	I U	K7	8 11			(C) Aesthetics (V) Aesthetic responsiveness
19. The student knows examples of computer enhancement of pictorial display (e.g., medical X-rays, geophysical and astronomical pictures).	I U	K3 K7	5 10 12			

8. Computer applications

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.4 Information management and retrieval						
1. The student is able to read and follow documentation in order to use a computer information storage and retrieval system.	I U H	P41	5 7			
2. The student knows types of data processing operations, including recording, classifying, calculating, sorting, retrieving and report generating.	I U H	K3 K7	3 5 7			
3. The student knows that information storage and retrieval systems are concerned with methods of creating and managing files to facilitate the recovery of pertinent records.	I U	G2	3 5 7			
4. The student knows common examples of information storage and retrieval systems (e.g., student records, inventory, ERIC).	P I U H	K1 K3	4 5		2.1.2 2.7.4 8.10	
5. The student knows types of organization for an information storage and retrieval system (e.g., keyword, sequential, direct, linked, table and pointer, etc.)	U H	K1 K2 K3	3		2.1.2 2.7.4 8.10	
6. The student knows factors to consider before implementing an information management system (e.g., computer size, external storage, data, time constraints, cost, user needs, etc.)	U H	K3 K7 K9	3 5 11 13	5	2.6.1 9.	

8. Computer applications

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.4 Information management and retrieval (cont.)						
7. The student knows advantages of using a computer for storage and retrieval of information (e.g., enables continual up-dating, allows quick recall).	P I U H	K5 K7 K8	4 5			
8. The student knows that data may have to be modified or tailored to be used in an information system.	I U H	G2 K3 K9	5 7			

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8. Computer applications

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.5 Instruction						
1. The student knows defining characteristics of major modes of computer use in instruction, including computer assisted instruction (CAI), computer augmented learning (CAL), and computer managed instruction (CMI).	I U H	K2 K3 K5	3 7 10	5		
2. The student is able to interact with a computer in instructional learning situations.	P I U	P35 P41 P66	7	5		
3. The student knows advantages and disadvantages of computer assisted instruction (e.g., advantages: providing immediate feedback, having infinite patience, keeping the learner actively involved, and individualized instruction; disadvantages: cost, possible lack of hardware or software to meet specific needs, inability to respond meaningfully under all circumstances).	I U H	K5	7			
4. The student knows examples of computer languages developed specifically for computer assisted instruction usage (e.g., COURSE-WRITER, IDF, PILOT, COPILOT, DECAL, PLANIT).	U H	K1 K3	5	5		

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8. Computer applications

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.5 Instruction (cont.)						
5. The student knows distinguishing characteristics of a language appropriate for use by authors of computer assisted instruction (e.g., requires little or no programming knowledge: permits a variety of responses by a student, including extra words and incorrect spelling; permits a variety of options based on student responses; simple yet flexible; does record keeping).	H	K3 K9	5 12			
6. The student knows major functional components of a computer managed instruction system, including scoring student responses, diagnosing educational difficulties, prescribing instructional objectives, and keeping historical records of student progress.	U H	K7	5 10			
7. The student knows types of programs suitable for computer augmented learning, such as programs that assist in problem solving, computer games, and computer simulations.	I U H	K3	5 7			
8. The student knows that gamelike computer programs can teach various concepts and skills.	P I U H	G2 K7	5	5		
9. The student knows factors that make computer simulation an advantageous way to experience certain learning situations (e.g., can reduce cost, time, and danger of actual implementation; can perform extensive computation).	I U H	K7 K8	5 7 12	5	8.8.4	

8. Computer applications

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.6 Numerical applications						
1. The student knows characteristics that distinguish numerical applications from other applications of the computer (e.g., in numerical applications, a disproportionate amount of time is spent on calculations compared to input/output operations).	U H	K3 K5	3 5 10			
2. The student knows that early applications of the computer were largely numerical (e.g., artillery firing tables, solving sophisticated equations, aerospace industry).	I U	G2 K4 K7	1 3 5			
3. The student knows types of numerical applications (e.g., linear programming, weather prediction, space shots, statistical analysis, mathematical proofs).	I U H	K3 K7	5 10			

8. Computer application

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.7 Operations research						
1. The student knows that operations research uses scientific techniques to study, and improve a wide variety of processes (e.g., data acquisitions, simulation, and linear programming).	U H	K1 K2 K7	5		2.	(V) Research (V) Inquiring
2. The student knows elements of a typical operations research technique, including: (a) the construction (in the form of equations) of models of the organization or process being studied; (b) testing the model for sufficient realism; (c) manipulating the model to study the detailed behavior of the process.	U H	K2 K7	5 7		2.5 2.	
3. The student knows that typical operations research applications would not be practical without the use of computers to perform calculations.	U H	G2 K7	5 12			
4. The student knows types of operations research applications which may help meet schedules, improve quality or lower cost of production processes (e.g., planning, scheduling, monitoring, measuring performance).	U H	K3 K7	3 5 10 12		9.2	

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8. Computer applications

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.8 Simulations						
1. The student knows that a simulation usually attempts to build a model of the essential aspects of reality, so that reality may be better understood or controlled (e.g., testing effects of manipulating economic factors, testing the flight of an airplane wing before it is built).	I U H	G2 K2 K7	5 10			
2. The student knows contributions of computer simulations to problem-solving processes.	I U H	G2 K7	1 7		11.3	
3. The student is able to select and use computer simulations.	I U H	P23 P45	5 7			
4. The student knows advantages and disadvantages of computer simulations for various purposes (e.g., advantages--permits expansion or compression of real time, allows experience without expensive equipment or danger, allows user to take an active role; disadvantages--may be too simplified, may be time-consuming to develop, may require an expensive system, is difficult to validate).	I U	K7 K8	5 10		8.5	
5. The student knows examples of computer simulation applications (e.g., investigation of medical treatments, study of effects of economic factors, future studies).	I U H	K3	5 7 10		9.	
6. The student is able to develop a computer simulation program.	I U H	P66 P75	7 10 12			

8. Computer applications

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.9 Symbol processing						
1. The student knows methods of using computers for symbol processing.	U H	K2 K7	3 5			
2. The student knows types of applications of symbol processing on a computer (e.g., algebraic expression simplification, lexical scanners, symbol tables and parsing in compilers and interpreters).	U H	K2 K3	5 10			

8. Computer applications

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.10 Telecommunications						
1. The student is able to access a remote computer.	P I	P35 P66	7			
2. The student knows basic terms related to telecommunication such as modem, coupler, modulation, simplex, half-duplex, full-duplex, multiplexing.	U H	G2 K1	5 7			
3. The student knows media by which computer usable data can be transmitted long distances (e.g., open wire pairs, wire-pair cables, coaxial cables, microwave radio, satellites, wave guides, lasers, optical fibers).	U H	K2 K7	5 7			
4. The student knows roles of major organizations involved in telecommunications (e.g., telephone companies, Western Union, The Federal Communications Commission, The International Telecommunications union, The Communication Satellite Corporation, communications unions).	U H	K1 K3 K6 K7	1 5			
5. The student knows types of computer applications made possible because of telecommunications (e.g., world-wide airline reservations; connecting branch businesses or warehouses with a central office; regional, national, and international information retrieval systems).	I U	K7	1 5		2.1.2 6.1	

8. Computer applications

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.10 Telecommunications (cont.)						
6. The student knows regional and nationwide data bases/collections he or she may access and search for information relevant to careers, personal interests, or inquiry subjects (e.g., DIALOG, BRS, ORBIT: Oregon Total Information Services Career Information System).	I U H	K1 K6	2 5 10	5	2.1.2 12.	
7. The student knows examples of new or recent applications of computer telecommunications developed for private and/or household use (e.g., computer conferencing, local community directories/information services run by radio stations or newspapers).	I U H	K3 K6 K7	5	2	2.1.2 9.6	
8. The student is able to select, access and search appropriate data bases as collections for information pertinent to career plans, to inquiry questions/subjects/issues, or to personal (leisure) interests.	I U H	P41 P63 P66	7 10	2 4 5	2.1.2 12.	

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8. Computer applications

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.11 Word processing						
1. The student knows terms used by computer scientists to describe word processing applications (e.g., text editing, text formatting, photo typesetting).	I U	K1	5			
2. The student knows characteristics and functions of word processing (e.g., manipulating printed material for corrections, formatting, aesthetic design).	U H	K2 K3 K7	3 5			
3. The student knows steps involved in text editing, including (a) enter the text through some computer compatible medium; (b) use an editing language to operate on the text as data; (c) output the revised text; (d) repeat the second and third steps if necessary.	U H	K2 K4 K7	3 5 7			
4. The student knows examples of word processing applications (e.g., editing to creat justified margins in the typeset columns of books, magazines, or newspapers; preparing and periodically revising large formatted tables and lists such as airline guides and telephone directories; analyzing literary works for style and authorship; creating concordances).	I U H	K3 K7	5 12	5		
5. The student knows operations performed in word processing applications (e.g., concatenation, inclusion, string pattern matching).	U H	K7	3 5			

COMPUTER EDUCATION

8. Computer applications

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
8.11 Word processing (cont.)						
6. The student knows characteristics of languages that have been developed with built-in symbol manipulation features (e.g., SNOBOL has operations for joinging and separating strings of characters, including sentences and formulas to test their contents and make replacements in them; some versions of BASIC have symbol manipulation features including LEN, MID, INSTR, SUBSTR, concatenation).	U H	K2	3 5 7			
7. The student is able to use word processing equipment to edit or format text.	U H	P66	7 10			

COMPUTER EDUCATION

9. Computer uses and their effects

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
9.1 General uses, effects, issues (See also: 10.3 Establishment of computers in society)						
1. The student knows ways computers both contribute to and help cope with the information explosion.	P I U	K7 K8	5 6 12	3 4		
2. The student knows various routine tasks which have been converted from manual performance to computer performance.	P I U	K4 K7	5	3 4		
3. The student knows benefits and disadvantages or costs of computerization of routine tasks (e.g., benefits: more reliable service, cost reduction, increased production; disadvantages/costs: computer crime, undue dependence on data processing equipment and personnel).	P I U H	K7 K8	12			
4. The student knows examples of ethical issues facing computer scientists, engineers, operators, programmers, etc., and/or those who use computer services.	I U H	K3 K8	6 11	4		
5. The student knows criteria for deciding whether or when to use computers for specific tasks (e.g., purpose, ethical considerations, time and resource constraints, cost/benefit ratio).	U H	K9	10 11 13			
6. The student knows arguments for and against regulation of the computing profession.	U H	K8 K9	5 6	4	12.	

9. Computer uses and their effects

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
9.1 General uses, effects, issues (cont.)						
7. The student knows issues relating to privacy and security in the use of computerized information systems (e.g., computerized security; use of codes, passwords, and cyphers; limitations on access; human rights).	I U H	K8 K9	13		9.9	(V) Privacy (V) Security
8. The student knows reasons that multi-access computer systems are vulnerable to exploitation (e.g., to criminal manipulation of files, to unethical or illegal use of data).	U H	K8	7 11 13			
9. The student knows issues related to computer crime (e.g., magnitude of thefts, difficulty and cost of prevention or apprehension).	I U H	K7	13			
10. The student knows examples and possibilities of disruption and disaster by failure of computerized systems (e.g., electricity blackouts, rocket blow-ups, bank errors, train collisions, nuclear accidents).	P I U H	K3 K7 K8	5 6 11			(C) Interdependence
11. The student knows ways computerization affects various aspects and sectors of the economy (e.g., effects of new products and services on job markets).	I U H	K4 K8	6			(C) Interdependence
12. The student knows how computerization accelerates the rate of change in technology and society.	U H	K4 K7 K8	6			(C) Change (C) Social change (C) Technology

9. Computer uses and their effects

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
9.1 General uses, effects, issues (cont.)						
13. The student knows meanings of the concept of "appropriate technology" as applied to computer-related social issues (e.g., technology appropriate to needs and capabilities of people served, and to limits/constraints on resources; technology selected rationally, rather than adopted uncritically because it's promoted as new, advanced, or a "breakthrough").	I U H	K8 K9	13		9.9	(C) Technology
14. The student knows meanings/applications of the terms "computer revolution" and "post-industrial society."	I U H	K1 K4 K6	6 13			
15. The student knows ways the computer revolution both raises and addresses issues of appropriate technology.	U H	K6 K7 K8	6 13			
16. The student is able to recognize and analyze computer-related issues encountered in various life roles.	I U H	P43 P44 P63	10 11 13	4	1.1.2	(V) Ethics (V) Social sensitivity

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9. Computer uses and their effects

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
9.2 Computer uses in business and industry						
1. The student knows purposes for use of computers in business and industry (e.g., maximize profits, perform routine tasks, build corporate image).	I U H	K7	5	3 5	8.1	
2. The student knows uses of computers for business and industrial management services and operations (e.g., collect and process data, for management decisions, solve design problems, verify theoretical models, research, transfer of funds).	I U H	K7	5		8.7 8.8 12.2	
3. The student knows ways computerization has affected corporate planning and budgeting.	U H	K4 K7 K8 K10	5 6 12	1 4	8.7 8.8	
4. The student knows uses of computers to do routine office tasks (e.g., billing, banking, telephone switching, personalizing mass mailings)	I U H	K7	5	3 4	12.1 12.2	
5. The student knows uses of computers in industrial design and production.	I U H	K7	5	3	12.2	
6. The student knows uses of computers in commercial and financial enterprises (e.g., inventory control for wholesale and retail marketing; listings indexes and exchanges in real estate, used parts businesses, brokerages; uses in banking: checkless/cashless transactions).	I U H	K7	5	3	12.2	

9. Computer uses and their effects

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
9.2 Computer uses in business and industry (cont.)						
7. The student knows uses of computers in the nuclear industry (e.g., in design, engineering; process monitoring and control in nuclear power production/distribution).	U H	K6 K7	5 6 13	3	12.2	
8. The student knows issues involved in computerization of business activities (e.g., centralization or decentralization, degree of corporate power held by data processing departments).	U H	K4 K6 K7 K8	6 11	4	12.2	
9. The student knows effects of computerization on employment (e.g., automation, job displacement, job matching).	U H	K4 K8	6	3 4	12.1	
10. The student knows current and projected uses of computers in the design and manufacture of computers.	U H	K4 K7	5	3	12.1	
11. The student knows issues/problems related to the prospect of a cashless/checkless society (e.g., automatic analysis of buying patterns, controlled flow of funds, centralized political control, error correction).	U H	K4 K6 K7 K8	1 5 6 11	3		
12. The student knows issues/problems involved in both centralized and decentralized computer systems (e.g., office in the home, change in commuting patterns; centralized control, security).	U H	K4 K6 K7 K8	1 6	4	9.6	

COMPUTER EDUCATION

9. Computer uses and their effects

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
9.3 Computer uses in education	P I U H	K4 K6				
1. The student knows uses of computers in educational management (e.g., files and record keeping, scheduling, budgeting, surveys and planning, program evaluation).		K7	1 5	3 5	9.2	
2. The student knows uses of computers in educational instruction (e.g., computer assisted instruction, computer managed curriculum).	P I U H	K7 K10	1 4 10	3 5	8.5	
3. The student knows effects of business/government commitment to the application of computers in education (e.g., individualized instruction, instructional management, curriculum organization, student and program evaluation).	P I U H	K7 K8	5 6 13	3		
4. The student knows uses and effects of computer accessed career information (e.g., projected employment opportunities, job opening lists, working conditions, wage rates).	I U H	K7 K8	1 5 10	3 5	12.2	
5. The student knows current and projected effects on education (elementary, secondary, and higher) of the growth of computerized information exchanges, data bases/files, library telecommunications networks, etc., (e.g., small, remote local schools and colleges can access all the scientific/scholarly literature available to large metropolitan universities).	I U H	K4 K6 K7 K8	5		2..2 2.7 8.4 8.10	(V) Access to resources (V) Cultural knowledge

COMPUTER EDUCATION

9. Computer uses and their effects
9.3 Computer uses in education

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
9.3 Computer uses in education						
6. The student knows uses of computers for scientific and historical research in universities and advanced studies centers.	U H	K4 K6 K7	5 6 12		8.1 8.7 11.8	(V) Research (V) Inquiring
7. The student knows issues related to computerization of instruction, of educational management information, or of academic research techniques and resources.	I U H	K4 K6 K7 K8	6 9 10 13			

COMPUTER EDUCATION

9. Computer uses and their effects

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
9.4 Computer uses in government (See also: 9.7 Computer uses in law enforcement and crime prevention)						
1. The student knows uses of computers in basic operations of governmental bureaucracies (e.g., record keeping, predicting, budget planning, program management, accounting).	I U H	K7	5	3		
2. The student knows uses of computers in legislative and administrative operations (e.g., simulation, public opinion polling, research, data reduction, information management).	I U H	K7	5	3		
3. The student knows uses of computers for specialized tasks of regulatory, planning, intelligence, or other federal government agencies.	I U H	K7	5	3		
4. The student knows uses of computers in political and electoral processes at federal, state or local levels (e.g., campaign records and lists, automatic mailings, projecting of election results).	I U H	K7 K10	7 10	3		
5. The student knows uses of computers in national defense and military research, weapons engineering, etc. (e.g., guided missiles and war machines, international telecommunications).	I U H	K7	5	3		
6. The student knows uses of computers in space programs.	I U H	K7	5	3		

9. Computer uses and their effects

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
9.4 Computer uses in government (cont.)						
7. The student knows uses of computers by local governments (e.g., traffic management, office tasks).	I U H	K7	5	3		
8. The student knows issues/problems related to government agencies' uses of computers (e.g., invasion of privacy, detection and correction of erroneous records, computer crime, growing dependence of governmental processes on the computer industry and related products/services).	U H	K7 K8 K10	5 6 13			(V) Privacy (V) Security (V) Rule of law
9. The student knows political, military and/or economic advantages gained through use of computer technology (e.g., highly sophisticated national defense warning and firepower systems, readily acquired fiscal information and funds control, targeted mailing lists).	U H	K7 K8	5 6			

COMPUTER EDUCATION

9. Computer uses and their effects

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
9.5 Computer uses in the arts						
1. The student knows applications of computer technology to research in aesthetics (e.g., analysis of art works, composition of new art works, research in art theory and creative process).	U H	K7	5 8	3	12.1	(V) Aesthetic responsiveness (V) Research (V) Cultural knowledge (V) Cultural arts
2. The student knows applications of computers in music (e.g., computer generated music, aid in composition, reproduction of sound, research in analyzing music).	U H	K7	5 8	3	12.1	(V) Aesthetic responsiveness (V) Cultural arts (V) Experimentation
3. The student knows changes developing in fundamental ideas about art as a result of computer use (e.g., how art is created, who makes it, and what are the roles of the artist in society).	U H	K8 K10	5 6 8	3		(V) Aesthetic responsiveness
4. The student knows uses of computers as extensions of human senses and intellect (e.g., complicated simulations, electronic microscope).	I U H	K7	5 8	4	8.	(V) Exploring (V) Aesthetic responsiveness

9. Computer uses and their effects

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
9.6 Computer uses by individuals/ families						
1. The student knows uses of computers for individual and household activities/tasks (e.g., record-keeping, entertainment, information retrieval, alarm monitoring, automated appliances).	P I U H	K7	5	2		
2. The student knows that public attitudes toward computer technology will influence and be influenced by future developments in computers and their applications in personal and family living.	I U H	K4 K8	1 5 6			
3. The student knows existing and potential effects of home computers on individual life, family and social relationships (e.g., advances ways for persons to practice isolation; gives opportunity for people of like interests to communicate more readily).	I U H	K4 K8	1 6	2		
4. The student knows advantages of various types of computers or computer systems for particular personal or household uses.	I U H	K3 K8	5 7 13			
5. The student knows factors to consider in consumer decisions about buying or leasing computer equipment for personal/household use.	U H	K9	9 10 13			
6. The student is able to evaluate the appropriateness of particular computers or computer systems for personal and/or household needs.	U H	P24	9 10 13			

9. Computer uses and their effects

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
9.7 Computer uses in law enforcement and crime prevention						
1. The student knows uses of computers in various law enforcement activities (e.g., police officer safety, accurate reporting of criminal statistics, tracking persons, interstate communications between police agencies).	I U H	K7	5	3		
2. The student knows documented and potential effects of computerization on crime prevention and detection.	I U H	K4 K8	6			
3. The student knows uses and effects of computer information retrieval on the study and practice of law (e.g., legal research).	U H	K7 K8	5 6	3		
4. The student knows uses of computers to verify evidence related to crime (e.g., electronic matching of identification evidence such as ballistics, voice, finger print, hand-analysis).	U H	K7	5 6			
5. The student knows legal, social, ethical or other issues related to the computerization of law enforcement activities.	I U H	K4 K6 K7 K8	6 11 13			

COMPUTER EDUCATION

9. Computer uses and their effects

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
9.8 Computer uses in recreation						
1. The student knows possible effects of computerization on leisure time (e.g., increased interest in information gathering and reference, increased role of the arts, applications supporting lifelong education).	P I U H	K7	5 6 8	2	9.3 9.5 9.6	
2. The student knows effects and implications of the application of computers to athletics (e.g., football play analysis, real-time measuring systems, systematizing performance measuring and training).	I U H	K7 K10	5 6 8	2		
3. The student is able to make use of computerized systems when planning recreation or vacations (e.g., travel and time scheduling, making and verifying reservations).	U H	P63	5 7 10	2		(V) Access to resources
4. The student is able to play computerized games.	P I U H	P65	7 8		3	(V) Enjoyment (V) Personal growth and development

COMPUTER EDUCATION

9. Computer uses and their effects

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
9.9 Computer uses and human behavior						
1. The student knows risks involved in relying on electronic calculators and computers rather than paper and pencil, mechanical and mental processes to compute or solve problems (e.g., consequences of mechanical failures, input errors).	P I U H	K8	6 12	1 2		(V) Social responsibility (V) Problem solving
2. The student knows potential consequences of increasing dependence on large scale computer system use (e.g., target selection systems during war, reduction in human knowledge of internal workings of complex management programs, entrenchment resulting from difficulty of changing complex computer programs).	I U H	K4 K8	6 9 11	1 2		(V) Judgment (V) Self-reliance (V) Flexibility (C) Mass Society
3. The student knows criteria for judging behavioral decisions based on computerized reports (e.g., accuracy of data; verifiable data with complete audit trail; adequacy of data to represent all relevant factors).	I U H	K9	10 11 13	4 5	2.6.1	(V) Judgment (V) Adequacy as basis for decision or action
4. The student knows possible effects of using computer technology on one's self-image as a problem-solver.	I U H	K8	13	1 2		(V) Self-knowledge (V) Technology

9. Computer uses and their effects

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
9.9 Computer uses and human behavior (cont.)						
5. The student knows views held by various scientific writers related to computer replacement of human society (e.g., robots, artificially intelligent communication between computers, computer decision-making for robot control, computerized mind control).	I U H	K4 K7	6 9 13	1 2	1.1.2	(C) Change (V) Privacy
6. The student knows alternative visions of human life, work and relationships with advanced, large-scale computer systems, as proposed by future scientists, science fiction writers, leading social critics and/or behavorial theorists.	I U H	K4 K5 K6 K7	6 9 13	1 2	1.1.2	(V) Fantasy (V) Prediction (V) Planning (V) Social responsibility
7. The student knows rationales and evidence supporting various projections about the effects of mass computerization on economic, social, political and/or individual existence.	U H	K3 K8	6 9 13	1 2	1.1.2	(V) Mass society

COMPUTER EDUCATION

10. History of computer development

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
10.1 Pre-computer						
1. The student knows factors that led to the development of early numeration systems and methods of counting (e.g., need to keep records).	P I U H	K4 K6 K8	1	1		(C) Technology
2. The student knows factors which influenced the development of early calculating devices (e.g., military and defense uses, accuracy and speed of calculation, need for accurate mathematical tables).	I U H	K4 K6 K8	1	1		
3. The student knows names and characteristics of early devices for manipulating numbers (e.g., Stonehenge, abacus, quipu, Napier's Bones, Pascal's adding machine, slide rule).	P I U H	K1 K3 K4	1	1		
4. The student knows names and contributions of major figures in the historical development of mechanical computation (e.g., Napier, Jacquard, Pascal, Leibniz, Babbage, Hollerith, and Bush).	I U H	K1 K4 K6	1	1		
5. The student is able to do simple calculations on an abacus.	P I	P35	1 3			
6. The student knows effects of the abacus and Napier's Bones on the development of calculating machines.	I U H	K2 K4 K7	1			
7. The student knows implications of the Leibniz wheel for the development of non-linear computing devices.	U H	K2 K4 K7	1			

COMPUTER EDUCATION

10. History of computer development

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
10.1 Pre-computer (cont.)						
8. The student knows major contributions of Blaise Pascal to the development of calculating machines.	I U H	K1 K3 K4 K7	1			
9. The student knows contributions of Charles Babbage to automating computation.	I U H	K1 K3 K4 K7	1			
10. The student knows major contributions of Joseph Jacquard to the development of data technology.	I U H	K1 K3 K4 K7	1			
11. The student knows effects of Herman Hollerith's tabulating equipment on the subsequent development of data processing (compilation and data entry systems).	I U H	K1 K3 K4 K7	1			
12. The student knows implications of John Van Neumann's contributions to the internal functions of the computer.	I U H	K1 K3 K4 K7	1			
13. The student knows factors that delayed/inhibited development of computing machines.	P I U H	K4 K6 K8	1			(C) Technology

COMPUTER EDUCATION

10. History of computer development

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
10.2 Development of computers						
1. The student knows devices which led to today's modern computers including the analytical engine, adding machines, calculators, ABC, Eniac, Mark I, and Univac.	I U H	K1 K4 K7	1			
2. The student knows names, approximate dates and contributions of major figures in the historical development of computers (e.g., Atanasoff, Eckert and Mauchly, Turing, Gunther, Aiken, Von Neumann & Hopper).	I U H	K1 K4 K7	1	1		
3. The student knows reasons for the advancement of the state of technology in the computer field (e.g., war, rapid growth of knowledge, information explosion).	I U H	K4 K6 K8	1			(C) Technology
4. The student knows significant technological leaps in the history of computing (e.g., vacuum tube-transistor-integrated circuit).	I U H	K4 K7	1 3			(V) Technology (C) Technology (C) Change
5. The student knows malfunctions of early electronic digital computers, and corrections that resulted in increased reliability (e.g., the mean time between breakdowns was small).	I U H	K3 K4 K7	1 3			
6. The student knows technological improvements which overcame the primary limitations of early computers (i.e., speed, storage).	I U H	K4 K7	1 3			

COMPUTER EDUCATION

10. History of computer development

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
10.2 Development of computers (cont.)						
7. The student knows impacts of the transistor on computer technology.	I U H	K4 K7 K8	1 3			
8. The student knows technology that has made computers accessible to society (e.g., technology that reduced costs and development of telecommunications, increased availability).	I U H	K4 K6 K7	1 3		8. 9.	
9. The student knows that technological advancements in the computer field have been materializing at an increasing rate.	I U H	K4 K7	1 3		6. 8. 9.	(C) Technology (C) Change
10. The student knows significant differences between first, second, and third generation computers	U H	K4 K5 K7	1 3		6.1 6.2.3	
11. The student knows relationships of current computing technology to computer technology of previous generations.	I U H	K4 K5 K7	1 3			
12. The student knows the historical evolution of computer languages.	I U H	K1 K2 K4	1			
13. The student knows important dates and the general sequence of important events in the development of computers (e.g., from grooves on walls of prehistoric caves, to modern abacus, calculators and computers).	P I U H	K2 K4	1			

10. History of computer development

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
10.3 Establishment of computers in society (See also: 9. Computer uses and their effects and subheadings)						
1. The student knows institutions which increasingly use and are increasingly dependent upon computers (e.g., defense, space programs, governmental agencies, colleges and schools).	P I U H	K3 K4 K6	1 7		8.8 9.1	(C) Interdependence (C) Mass society
2. The student knows factors which have contributed to the increasing use and resulting dependence of our modern-day society on computers (e.g., greater reliability, reduction in cost and size, complexity of modern society, large data bases, knowledge explosion, need for fast processing and communication).	I U H	K3 K4 K6 K8	1 3 12	3 5	9.1	(C) Interdependence (C) Change (C) Technology (C) Mass society
3. The student knows technology that made computers accessible to society in the 1960's (e.g., technology that made the cost go down; telecommunications).	I U H	K4 K7 K8	1 7 10			
4. The student knows recent technological developments which have dramatically reduced the cost of computers and increased their availability.	I U H	K4 K7 K8	1 7 10			
5. The student knows how current technological developments have made ownership of personal computers possible for most American adults.	I U H	K3 K4 K8	1 3	2 3 5	9.6	(V) Access to resources

COMPUTER EDUCATION

10. History of computer development

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
10.3 Establishment of computers in society (cont.)						
6. The student knows technological developments which have improved communication between humans and computers (e.g., simple computer languages, means of presenting computers with drawings, pictures, and text, means of communicating directly by voice rather than by typewriter terminal).	I U H	K2 K3 K7	1 3 12	3 5		(C) Communication
7. The student knows ways the development of complex circuits (LSI chips) has simplified the design of complex electronic systems used in calculators, computers and consumer appliances (e.g., devices have fewer discrete components).	I U H	K2 K3 K7 K8	1 3	3 5	6.2.1	

COMPUTER EDUCATION

11. Computer science

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
11.1 Algorithms						
1. The student knows that an algorithm is a definite sequence of steps to solve a particular problem within a finite time.	I	K1 K2	7 10			(C) Algorithm
2. The student is able to select an appropriate algorithm in problem-solving situations.	I U H	P33 P63	7 10		7.2.1.1	
3. The student knows that more than one algorithm may exist to solve a problem.	I	K3 K7	7 10			
4. The student knows that more than one program can be written to implement an algorithm.	I	K3 K7	3 7 10			
5. The student knows criteria to use in evaluating the efficiency of alternate algorithms that lead to the solution of a particular problem (e.g., speed, memory size, complexity).	U H	K9	3 7 10			(C) Efficiency
6. The student is able to generate appropriate data to use in the comparison of alternate algorithms.	I U H	P33	7 10			
7. The student is able to improve algorithms based on the appropriate criterion (e.g., speed, memory size and complexity).	I U H	P33	7 10			
8. The student is able to determine whether a proposed algorithm is translatable into a computer program (e.g., Is it quantifiable? Unambiguous?).	I U	P42 P43	5 7 10			

COMPUTER EDUCATION

11. Computer science

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
11.1 Algorithms (cont.)						
9. The student knows criteria for judging whether an algorithm is best implemented on a computer vs. other methods (e.g., could it be done more easily on a calculator?).	I U	K3 K7 K8	5 7 10 13			
10. The student knows computer resources available to her or him for the execution of a program.	I U H	K3 K7	4 5 7 10			
11. The student is able to determine the computer capabilities necessary to execute a program for an algorithm (e.g., How much internal memory is necessary? How fast is the CPU? What I/O devices are required? How much disk space is required?).	U H	P24 P47 P63	5 7 10			
12. The student knows algorithm design techniques, including subgoals, hill climbing, working backward, backtracking, and recursion.	I U H	K2 K7	3 7 10			
13. The student is able to verify the correctness of an algorithm (e.g., Is it finite? Is it unambiguous? Does it solve the given problem?).	I U H	P24 P63	3 7 10			
14. The student is able to develop appropriate proposed algorithms in response to a given problem.	I U H	P33 P63	7 10			
15. The student is able to develop a heuristic method for attacking a problem in the absence of an algorithm.	I U H	P43 P63 P67	7 10			

11. Computer science

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
11.2 Discrete mathematics (See also 3.2 Mathematical skills)						
1. The student knows discrete mathematics to the level necessary for application to other areas of computer science.	U H	G1 G2 K2	4 7			
2. The student knows elements of set theory that apply to computer science (e.g., elements, subsets, Venn diagrams, empty set, Universal set, set operations, algebra of sets, the counting principle).	U H	G1 K2 K7	3 5 7			
3. The student knows elements of graph theory that apply to computer science (e.g., basic terms of graph theory such as nodes, paths, walks, and connectivity, directed versus undirected graphs, finite versus infinite graphs).	U H	G1 K2 K3	3 5 7			
4. The student knows elements of combinatorial analysis that apply to computer science (e.g., permutations, combinations, partitions, and the fundamental principle of counting).	H	G1 K2 K3	3 5 7			
5. The student knows elements of probability that apply to computer science (e.g., sample space, event, experimental results, probability of an event, and conditional probability).	U H	G1 K2 K3	3 5 7		3.2.2	

11. Computer science

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
11.2 Discrete mathematics (cont.)						
6. The student knows elements of statistics that apply to computer science (e.g., mean, median, mode, standard deviation, variance, correlation coefficient).	U H	G1 K2 K3	3 5 7			

11. Computer science

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
11.3 Searching and sorting (See also: 2.1.2 Locating and using resources; 2.3.3 Classifying, grouping, categorizing; 2.3.4 Ordering, sequencing)						
1. The student knows major reasons for sorting (e.g., to find all matching elements; to make tabulating, dating, and merging easier).	U H	K3 K7	3 7			
2. The student knows examples of sorting from everyday life (e.g., arranging a hand of cards, ordering a set of grades, alphabetizing, etc.).	I U H	K3	3 10			
3. The student knows basic terms related to sorting, (e.g., ascending order, descending order).	I U H	K1 K2	3 7			
4. The student knows the difference between internal sorting and external sorting, and when external sorting is necessary (e.g., internal sorting: - data to be sorted is stored in main memory; external sorting: - data to be sorted is in external storage).	H	K2 K5 K9	3 7			
5. The student knows major categories of sorts such as insertion, exchange, selection, enumeration, and merge.	H	K1 K2	3 7			
6. The student knows various algorithms for sorting.	H	K3 K7	3 7			

11. Computer science

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
11.3 Searching and sorting (cont.)						
7. The student is able to write a computer program to sort a list of numbers.	U H	P35 P41 P46	3 7 10			
8. The student knows factors that relate to the efficiency of a sorting technique (e.g., memory, speed, number of passes made through the list, the number of comparisons made, the number of exchanges made or the number of times data is moved).	H	K3 K7 K8 K9	3 7 10			
9. The student knows examples of searching from everyday life (e.g., looking up a phone number, using an index, searching a list of identification numbers, etc.).	I U H	K3	3 10			
10. The student knows algorithms for different types of searches (e.g., sequential search, binary search).	U H	K3 K5 K7	3 10			
11. The student knows factors that relate to the efficiency of a searching technique (e.g., memory, speed, number of passes made through the list, number of comparisons made).	U H	K3 K9	3 4 7			

COMPUTER EDUCATION

11. Computer science

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
11.4 Data structures						
1. The student knows characteristics that distinguish dynamic from static data structures (e.g., dynamic structures may be expanded or contracted while static data structures have a maximum fixed size).	I U H	K3 K5	4 7 10			
2. The student knows characteristics of pointer or link variables as used in stacks, queues, linked lists, and trees.	U H	K1 K2 K3	3 7 10			
3. The student knows characteristics of data structures, including simple variables, arrays, strings, lists, linked lists, stacks, queues, trees, and files.	I U H	K3 K5	3 4 7 10			
4. The student is able to select an appropriate data structure for data being manipulated (e.g., a simple variable for a single value, a tree for a chess program, a linked list for an information retrieval system).	U H	P33 P35	4 7 10			
5. The student knows conventional terms used with files, including data elements, fields, and records.	I U	K1 K2	3 10			
6. The student knows characteristics of sequential and random access files.	I U	K2 K3 K5	3 7 10			

11. Computer science

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
11.5 Information theory (See also: K-12 Course Goals in Biological and Physical Science: 5.17 Information)						
1. The student knows major terms and concepts used in the study of information and information-carrying systems (e.g., bit, information, system, channel, redundancy, capacity).	I U H	K1 K2	3 4			(C) Information
2. The student knows advantages of packing information for transfer and storage (e.g., allows more information to be transferred in a given time, saves computer storage space, etc.).	I U	K6 K8	3 7			
3. The student knows methods of checking for accurate transfer of information (e.g., parity checking, double transmission).	U H	K2 K7	3 7			(C) Accuracy
4. The student knows that some elements of information might be omitted without generally affecting communication (e.g., 'elephan' strongly suggest elephant, 'Christmas comes but once a ....' strongly suggests that the missing word is 'year').	I U	G1 K3	3 7			

COMPUTER EDUCATION

11. Computer science

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
11.6 Logic						
1. The student knows the properties of the relations AND, XOR, OR, NAND, NOR and NOT.	I U H	K1 K3	3 4 7			
2. The student is able to test Boolean expressions by using truth tables, block diagrams, Venn diagrams, etc.	U H	P35 P47	3 4 7			
3. The student is able to use postulates and theorems of Boolean algebra to simplify Boolean expressions.	H	P35 P52	3 4 7			
4. The student knows the relationship of Boolean expressions to electronic diagrams.	H	P37 P45	3 4 7			

COMPUTER EDUCATION

11. Computer science

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
11.7 Mathematical programming						
1. The student knows properties of a mathematical programming problem including: (a) a table of constructs which describe the factors in a problem; (b) sets of variables of unknown values, one of which is the optimum solution to the problem; (c) the equation which relates the values of each set of variables to the goal; (d) selecting the set of variables which satisfies the table requirements and produces the optimum values.	H	K3	3 4 7			
2. The student knows assumptions upon which mathematical programming is based (e.g., mathematical model can be constructed; the goal or objective can be expressed as the minimization or maximization of an expression).	H	K2 K3	3 4 7			
3. The student knows characteristics of mathematical programming applications that make computer implementation advantageous, (e.g., number of equations, number of variables, size of the table, complexity of mathematical operations, collection of auxiliary and service routines, large number of calculations).	H	K3 K9	3 5 10 13			

11. Computer science

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
11.7 Mathematical programming (cont.)						
4. The student knows characteristics distinquishing linear from nonlinear programming (e.g., linear: straight line graphs, more popular, solution using matrices and determinants; non linear: curved graph, more complicated, solution using search techniques such as hill climbing and heuristics).	H	K3	3 4 7			
5. The student knows categories of support programs necessary for computer implementation of mathematical programming (e.g., information storage and retrieval of table elements, collection of data for a linear programming run, varying the objective equation coefficients, and output editing).	H	K2 K3 K9	3 5 10			

COMPUTER EDUCATION

11. Computer science

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
11.8 Numerical computing						
1. The student knows characteristics of numerical computing (e.g., seeks numerical solutions to equations or systems of equations, systematically treats errors which result from such computations).	H	K3	3 7			
2. The student knows examples of computer programs that are numerical applications (e.g., regression analysis, roots of equations, areas under curves, simultaneous linear equations, mathematics of prediction).	H	K2 K3	3 7			

11. Computer science
11.8 Numerical computing

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
11.8.1 Data representation						
1. The student knows terms used by computer scientists to refer to individual units of computer storage (e.g., bit, byte, nibble, word).	I U	K1 K2	4 7 8			
2. The student knows properties of the internal representation of characters (e.g., stored as numbers using a code such as ASCII or EBCDIC).	I U	K3	4 7 8			
3. The student knows characteristics of the internal representation of data, including fixed point (integer) numbers, floating point (real) numbers, and logical values (e.g., 1's complement, 2's complement, excess radix, signed magnitude).	U H	K3	4 7 8			
4. The student knows effects that different internal representations of data have on the performance of computers (e.g., speed, accuracy).	U H	K3 K7	3 7 8			

COMPUTER EDUCATION

11. Computer science
11.8 Numerical computing

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
11.8.2 Computer arithmetic						
1. The student knows properties of the binary, octal and hexadecimal numbering systems (e.g., place value, positional notation, radix).	U H	K3	4 7 8			
2. The student is able to select and use appropriate methods for converting between the binary, octal, decimal or hexadecimal numbering systems.	U H	P35 P45	4 7 10			
3. The student is able to perform the four basic operations of arithmetic in the binary, octal and hexadecimal numbering systems.	I U H	P35	4 7 10			
4. The student knows methods used by computers to perform arithmetic (e.g., 2's complement, 1's complement, repeated addition).	U H	K3 K7	3 7 10			

COMPUTER EDUCATION

11. Computer science
11.8 Numerical computing

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
11.8.3 Numerical Analysis						
1. The student knows factors affecting the accuracy with which numbers are represented internally within the computer (e.g., no precise equivalence between some binary fractions and decimal fractions, finite length of data words).	U H	K3 K7 K9	3 7 10			(C) Accuracy
2. The student knows sources of errors in numerical output generated by computers (e.g., initial errors-variations in data recording or in taking measurements; truncation--the process of "chopping" all digits beyond a specific number; rounding errors--less significant digits of a quantity are deleted and a rule of correction is applied; propagated errors--cumulative buildup of errors during computation).	I U H	K3 K7	3 7 10			
3. The student knows effects of the internal representation of numbers in the computer on some mathematical properties (e.g., finite length of real numbers, cancellation law not holding, associative law not holding, the set of computer numbers are not evenly spaced).	U H	K3 K7	3 7 10			

11. Computer science

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
11.9 Mathematical models						
1. The student knows key terms related to the mathematical or abstract modeling of computers (e.g., finite state machines, Turing machine, automata theory, computability, etc.).	H	K1 K2	3 4 7 10			(C) Models
2. The student is able to write Turing machine programs to perform simple operations such as adding or subtracting two numbers.	H	P35 P41	3 4 7 10			
3. The student knows the relationship between a universal Turing machine and an electronic digital computer.	H	K3 K7	7 8 10			

COMPUTER EDUCATION

11. Computer science

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
11.10 Structure of program languages (See also: 7.3 Programming languages and subheadings)						
1. The student knows built-in features implemented in some higher order computer languages (e.g., recursion, storage allocation and deallocation, special functions, data structures, local variables).	H	K3 K7	3 7 10			
2. The student knows that languages may be formally described by features such as syntax and semantics.	H	K2 K3	3 7 10			
3. The student knows characteristics that distinquish the syntax of a computer language from its semantics (i.e., syntax refers to the set of rules that define the acceptable strings of symbols in a language and their grammatical structure, while semantics refers to the meaning of a string of symbols).	H	K2 K3	3 7 10			
4. The student knows types of variables allowed in different computer languages (e.g., INTEGER, REAL, LOGICAL, CHARACTER, BINARY).	U H	K2 K3	3 7 8			
5. The student knows how control structures are implemented in a computer language (e.g., DO, FOR-NEXT, IF-THEN-ELSE).	H	K3 K7	3 7 8			

11. Computer science

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
11.10 Structure of program languages (cont.)						
6. The student knows terms that refer to aspects of translating higher order languages for execution (e.g., lexical scanner, parsing, semantic routines, error recovery routines, interpreters, compilers, etc).	H	K1 K2 K3	3 7 8 10			
7. The student knows characteristics of binding a value to a variable (e.g., declaration, scope of variables--local or global, storage allocation and deallocation, parameter passing between procedures).	H	K3 K7	3 7 8 10			
8. The student knows steps in the translation of a higher order language for execution, including lexical scanning, parsing, semantic routines, etc.	H	K2 K4	3 7 8 10			
9. The student is able to write a program that does a step in the translating of a higher order language.	H	P34 P35 P66 P67	3 7 8 10			

COMPUTER EDUCATION

12. Computer education and careers

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
12.1 Opportunities and awareness						
1. The student knows issues relating to the effects of computers on employment (e.g., job displacement, retraining, changes in types and levels of skills necessary for certain jobs).	P I U H	K3 K4 K8	1 2	3	9.1 9.2	
2. The student knows examples of replacement of human labor by computer labor.	P I U H	K3 K4	1 2	3	9.1 9.2	
3. The student knows that as computers are used for more and more tasks, computer-related skills and experience become advantageous in an increasing variety of careers outside the computer industry and data processing fields.	P I U H	K4 K9	1 2	3	9. 10.3	
4. The student knows examples of varied careers in which one may use the computer.	P I U H	K3 K6	2 5	3		
5. The student knows the nature, location and typical consumers of local computer-related industries (e.g., manufacturers, software consulting firms, sales and maintenance organizations, service bureaus).	I U H	K6 K7	2 4 5	3		
6. The student knows examples of careers created directly by the computer industry (e.g., clerical, business or scientific programming; computer design, sales, engineering, management, fabrication; customer service, operators, maintenance).	P I U H	K3 K6 K7	1 2 5	3		

COMPUTER EDUCATION

12. Computer education and careers

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
12.1 Opportunities and awareness (cont.)						
7. The student knows examples of careers created indirectly by the computer industry.	P I U H	K3 K4 K7	1 2 5	3		
8. The student knows effects that development of new applications and continued growth in computer related industries have and may have on future employment.	P I U H	K4 K7 K8	1 2	2 3		
9. The student knows factors that lead to the continual growth in the demand for computer services.	P I U H	K4 K7 K8	1 2 5	3		
10. The student knows principal job classifications in the data processing field (e.g., computer operator, programmer, system analyst, systems programmer, computer center manager, and data preparation clerk).	I U H	K1 K3 K6	2 3 5	3		
11. The student knows employment projections in the data processing field.	U H	G2 K4	2 5	2 3		

COMPUTER EDUCATION

12. Computer education and careers

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
12.2 Requirements and exploration						
1. The student knows job duties and characteristics of various work situations in the computer field (e.g., those used by the Bureau of Labor Statistics, Career Information System, etc.).	I U H	K3 K5 K7	2 5	3		
2. The student knows characteristics of experience-based career education programs (e.g., work experience programs, job clusters).	I U H	K3 K6	2 5	3		
3. The student knows ways computers are used for job search and placement.	I U H	K2 K6 K7	2 5	3	2.1.2 8.4 8.10	
4. The student is able to use appropriate programs to clarify career interests (e.g., CIS, GIS, DISCOVER, Standardized intent inventories).	I U H	P62 P63	2 4 5	3 4 5	1.1.1	
5. The student is able to use appropriate programs to retrieve information on careers (e.g., CIS, GIS).	I U H	P62 P63	2 5 10	3 4 5	2.1.2 8.4 8.10	
6. The student knows skills and educational qualifications necessary for entry and advancement in various computer-related jobs.	I U H	K9	2 10	3 4 5		

COMPUTER EDUCATION

12. Computer education and careers

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
12.2 Requirements and exploration (cont.)						
7. The student knows personal characteristics which contribute to one's effectiveness or satisfaction in data processing careers (e.g., accuracy, precision, willingness to learn continually, skill at focusing on different levels of detail during a problem-solving process, flexibility and readiness to make changes, tolerance for tedium).	I U H	K3 K7	2	3 4 5		(V) Accuracy (V) Openness (V) Flexibility (V) Perseverence
8. The student knows sources of vocational guidance at his or her school (e.g., counselors, librarian, school placement bureau, etc.).	I U H	K2 K6	2	3 4 5		
9. The student is able to find information which fully describes such data processing jobs as computer operator, programmer, system analyst, systems programmer, computer center manager, and data preparation clerk.	I U H	P62 P63	2	3 4 5	2.1.2 8.4 8.10	
10. The student knows typical employers of data processing personnel (e.g., banks, insurance companies, manufacturers of computer equipment, manufacturers of equipment containing computers, retail merchandizing firms, and data processing service organizations).	P I U H	K2 K6 K7	2 5	3 4 5		

COMPUTER EDUCATION

12. Computer education and careers

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
12.3 Training and preparation						
1. The student knows school courses which aid in preparation for data processing careers (e.g., math, introduction to business, typing, bookkeeping/accounting).	U H	K2 K3	2	3 4 5		
2. The student knows sources of specialized training for data processing occupations (e.g., manufacturers, private computer schools, in-house training programs of computer users, colleges, and universities).	I U H	K2 K6 K7	2 5	3 4 5		
3. The student is able to locate information about requirements and characteristics of specialized training programs.	U H	P41 P63	2	3 5		
4. The student is able to plan and select courses, work experiences, etc. to meet requirements for entry into a computer related training program or career.	U H	P62	2 10	4 5		

COMPUTER EDUCATION

12. Computer education and careers

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
12.4 Job search and employment						
1. The student knows various resources which identify employment opportunities (e.g., newspapers, employment agencies, trade journals, women's/minority's resource centers).	I U H	K2 K6	2	3 4 5		
2. The students knows steps for applying for a job (e.g., letter of application, data sheet, application blank, interview, follow-up).	U H	K4	2	5		
3. The student is able to write a letter of application, data sheet, follow-up letter, and fill out an application blank.	U H	P65	2	5		
4. The student knows techniques for handling an interview (e.g., dressing appropriately. taking necessary documents, knowing what to say, when to leave, and how to follow up).	U H	K2 K7	2	5		
5. The student is able to carry out an intelligent interview when applying for a job.	U H	P65	2	5		
6. The student is able to compose and present a complete resume when applying for a job.	U H	P65 P66	2	5		
7. The student is able to plan and follow an appropriate job search strategy.	U H	P62 P63	2	4 5		

APPENDIX I: CONCEPT LIST

Accuracy

Algorithm

Change

Communication

Documentation

Efficiency

Information

Interdependence

Mass society

Models

Social change

Social stability

Systems

Technology

APPENDIX II: COMPUTER-RELATED ISSUES

Goals dealing with computer-related issues are of two types: (1) those referring to knowledge and skills used for analysis or resolution of value conflicts, social issues or controversies; (2) those referring to knowledge of particular issues, problems or areas of controversy relevant to computer education. Goals of the first type are found principally in section 9. Computer uses and their effects.

For the convenience of those planning issue-oriented courses, an alphabetical listing of issue/problem areas follows, with references to goals by page and goal number. The list is by no means comprehensive. Rather, it relects some major current concerns related to computer applications, uses, their actual and potential effects on personal and societal life. It may and should suggest many other issues of equal importance and instructional value to computer education students.

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